PRESCRIBING OF MEDICATIONS

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INTRODUCTION

We call each separate chemical entity a substance. A drug is a substance or their mixture that is used in a certain amount (dose) and under certain conditions for the treatment, prevention or diagnosis of a disease. A poison is a substance or their mixture that, even in the smallest biologically active doses, causes damage or death to an organism. Dose is the amount of medicine or poison that is introduced into the human body. The difference between medicine and poison is not sharp: often a medicine can become a poison if it is administered in a sufficiently large dose and in some other way than usual. Calcium gluconate is a drug which administered as a slow intravenous injection in a dose of 10 ml of 10% solution can save the life of a patient with hyperkalemia or hypocalcemia. The same substance, if administered in a several times higher dose and as a rapid intravenous injection, can cause fatal cardiac arrest in the patient we are treating.

ORIGIN OF DRUGS

Medicines can be synthesized chemically, and they can also be obtained by processing parts of animals, plants or minerals. That is why it is said that drugs can be of synthetic, plant, animal or mineral origin. Most of the drugs used today are of synthetic origin. For example, a purely synthetic drug is olanzapine, an atypical antipsychotic very active in the treatment of schizophrenia and other types of psychosis. The root of primrose (Primula officinalis), dried and chopped, is a herbal medicine from which an extract is obtained by cooking, which is very effective in the treatment of productive cough. Insulin was obtained from the pancreas of animals for a long time, but today it is

completely switched to the use of insulin with the same composition as human insulin, but obtained from bacterial cultures through the process of genetic engineering . A medicine of mineral origin is petroleum jelly, a mixture of long-chain hydrocarbons that is obtained as one of the products of the oil distillation process .

PHARMACOPEIA

Pharmacopoeia (Greek **pharmakopoiia**, Latin **pharmacopoea** = preparation of medicines) is a book usually issued by the Ministry of Health of a country and which contains regulations for the preparation of medicines, often notes on use, determining their identity, examining the quality of medicines, dosing and storing medicines. All doctors and pharmacists must follow the instructions given in the pharmacopoeia. The first pharmacopoeia was published in Florence. **Nuovo Receptario Composito**, written in Italian, was published in 1498. It was written by a doctor-pharmacist guild in the Italian language, under the auspices of the then political leader in Florence, the Dominican priest Savonarolo. It was based on Greek-Arabic knowledge about medicines, and was issued with the aim of standardizing pharmacy practice, so that the medicines prepared in all pharmacies would be of uniform quality. After 20 years, it was translated into Latin and became available to pharmacists in other European countries. In the first part, various medicinal substances and instructions for the preparation of medicines are listed. Then follows a section with detailed explanations on making pills, syrups and other forms of medicine.

The first pharmacopoeia was issued in Serbia in 1881 by the name „Pharmacopoeia Serbica editio prima". Due to the new knowledge that was obtained in the meantime, the new editions of the pharmacopoeia were changed and supplemented. In 1908, the second edition of the Serbian pharmacopoeia was published : "Pharmacopoea Serbica editio secunda". After the first world war and formation of Kingdom of Serbs, Croats and Slovenians Pharmacopoeia Serbica editio secunda" became official pharmacopoeia of this new state. In 1933, "Pharmacopoea Serbica editio secunda" was amended and supplemented. It has grown into Pharmacopoeia Jugoslavica editio prima". After the Second World War, new editions of the Yugoslav pharmacopoeia followed: II edition (1951), III edition (1972) and IV

edition (1984). The 1984 edition named " Pharmacopoeia Jugoslavica IV " was used in our country until 2000, when new edition became official: "Pharmacopoea Jugoslavica 2000, editio quinta", an almost literal translation of the pharmacopoeia valid in the European Union. Although the Federal Republic of Yugoslavia broke up in 2008 into Serbia and Montenegro, a new edition of " Pharmacopoeia" has not yet been published in Serbia.

Pharmacopoeia Jugoslavica IV had two parts. The first part (the first volume) was called general and contained: (a) a description of methods for identifying drugs and testing their purity; (b) description of methods for controlling the correctness of medicines; (v) a description of the method of manufacturing certain forms of medicines (eg powders, ointments, pastes) and (g) a list of physico-chemical constants, reagents and indicators. This part of pharmacopoeia is intended for pharmacists and drug manufacturers.

The second part (the second volume) was called Materia medica (according to the book written by the Greek physician Dioscorides in the first century AD, which was actually a collection of texts and pictures about certain medicinal plants and the preparations that could be made from them) and contained in alphabetical order monographs on individual medicines. Medicines whose monographs are in the pharmacopoeia are called officinal (official) medicines and every pharmacy in our country should have them. Each monograph contains the following parts: (1) title (it is always the Latin name of the drug), (2) other names of the drug, (3) structural and molecular formula of the drug with molecular weight, (4) physico-chemical properties of the drug, (5) drug identification methods, (6) drug constants, (7) drug purity testing methods, (8) drug activity determination, (9) drug doses, (10) drug action and use, (11) drug storage and (12) incompatibility of drugs with other substances. The dosages of the drugs listed in the monograph were mandatory *and* referred to a healthy adult with a body weight of about 70 kg. The following were always stated: the average single dose of the drug (the therapeutic dose administered once), the maximum single dose of the drug (the largest amount of the drug that can be given to the patient at once) and the maximum daily dose of the drug (the largest amount of the drug that can be given to the patient during one day). The doctor can exceptionally exceed the maximum doses of the medicine (if the patient's condition requires it), but then

he/she must add an exclamation mark (!), write the dose in letters and sign the dose in the prescription.

Pharmacopoea Jugoslavica 2000, editio quinta, has 3 volumes. In the first volume there is a general part, which has 5 chapters: (1) General remarks, (2) Methods of analysis, (3) Packaging, (4) Reagents and (5) General chapters. In the " General remarks" there is an explanation of the abbreviations and symbols that are used later in the text, as well as the relationships of individual units of measure. Chemical tests for the identification and determination of substances, biological tests that test the correctness of medicinal preparations, pharmaceutical-technological procedures for testing medicinal preparations and the apparatus on which such tests are performed are described in "Methods of analysis". The "Packaging" section is dedicated to the standards that must be met by materials manufactured for packaging of medicinal preparations. Standards for reagents used in the analysis of medicinal preparations are described in " Reagents ". At the end of the first volume, in the "General Chapters", the most important facts about the sterilization of medicinal preparations, the production of vaccines, the statistical processing of the results and the types of medicinal preparations are presented.

The second and third volumes of the current pharmacopoeia constitute special parts, and contain monographs on substances used in medicine and pharmacy. The monograph of each substance contains the following parts: name of the substance, structural formula, molecular weight, description of the substance, its properties, identification procedure, testing and determination procedure, storage and labeling.

The main difference between Pharmacopoeia Jugoslavica 2000 and previous pharmacopoeias is the ***lack of formulas (compositions) for the preparation of galenic medicinal preparations*** in the new pharmacopoeia (galenic preparation - any medicine prepared in a pharmacy) . In earlier pharmacopoeias, such compositions were called " Formulae officinales " , so the doctor could write only the name of the galenic medicinal preparation in the prescription, and the pharmacist would prepare it according to the composition (formula) from the pharmacopoeia. Such prescription of drugs was called " officinal " , and it made the doctor's job much easier when he wanted to prescribe a galenic medicinal preparation (such preparations were called "officinal" preparations). With the entry into force of the current pharmacopoeia in 2000, the prescription of officinal preparations is no longer possible.

TYPES OF DRUGS BY METHOD OF PRODUCTION

Medicines can be classified into several groups according to the way they are produced (prepared). The main groups of drugs on that basis are :

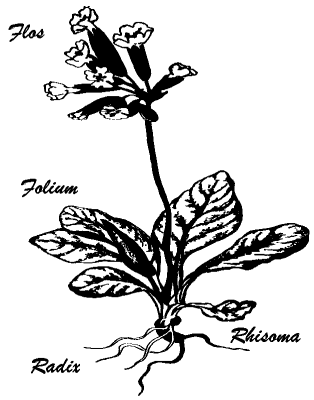
1. herbal, animal or mineral preparations
2. chemical substances
3. galenic preparations
4. ready-made medicines, which are divided into two subgroups: chemical and biological
5. serums and vaccines .

1. HERBAL, ANIMAL OR MINERAL PREPARATIONS

Herbal, animal or mineral preparations are raw or dried parts of plants and animals, or certain minerals. The Latin names for the parts of plants that are used in writing prescriptions are :

- **root** - radix (nominative singular), radicis (genitive singular)
- **underground tree** - rhizoma, rhizomatis
- **thickening on the stem or root** - tuber, tuberis
- **bulb** - bulbus, bulbi
- **bark** - cortex, corticis
- **part of the tree** - lignum, ligni
- **waist of plants** - stipes, stipitis
- **whole plant** - herba, herbae
- **leaf** - folium, folii
- **flower** - flos, floris
- **the fruit** - fructus, fructus
- **resin** - resina, resina

In Figure 1, you can see the parts of the medicinal plant primula officinalis (Primula officinalis) that are used in medicine as drugs.



Herba: Primula officinalis

Picture 1. Medicinal plant of bitter gourd, whose underground stem and root contain saponins - surface-active substances that, when introduced into the human body, effectively support the expectoration of bronchial secretions.

The substance or substances that are an integral part of drugs and that have a pharmacological effect in the body are called active principles of drugs. The active principles of drugs can be classified into several groups:

a) Alkaloids

Alkaloids are active principles whose name comes from the basic reaction they exhibit in solution. They have various pharmacological effects, depending on their chemical structure. Some of the more important alkaloids are nicotine (active principle from the leaf of the Nicotiana tabacum plant), atropine (from the fruit of the Atropa belladonna plant), scopolamine (from the leaf of the Hyoscyamus niger plant) and morphine (found in the juice obtained by cutting unripe pods of the opium poppy - Papaver somniferum).

b) Glycosides

Glycoside molecules always consist of two parts: genin (which usually has a steroid core) and mono- or polysaccharide. Genin (also called aglycone) is the carrier of pharmacological activity, while sugar molecules increase the hydrophilicity of the glycoside and enable it to reach the site of action in the body. Among the most important glycosides are those that increase the force of heart contraction - digoxin, digitoxin (from the leaves of the plants Digitalis lanata and Digitalis purpurea; picture 2), convalotoxin (from lily of the valley) and

oleandrin (from oleander). Oral glycosides may cause a bitter or pungent sensation; the characteristic taste of onion, horseradish and radish comes from sulfur-rich glycosides.

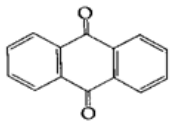
Figure 2. Digitalis purpurea

c) Saponins

Saponins are chemically similar to glycosides. They got their name because of their ability to reduce the surface tension of water; when mixed with water they cause foam to form. People in Vojvodina have been using this property of saponin for centuries, using a water extract of a plant called "soap grass" (Saponaria officinalis) for washing clothes. Apart from soapwort, saponins are contained in primrose (Primula officinalis), mullein (Verbascum thapsiforme), white soapwort (Gypsophila panicuata) and other plants. The water extract of primrose is an excellent medicine that facilitates the coughing up of thick and stringy secretions from the bronchi, because it leads to its dilution.

g) Anthraquinone derivatives

Anthraquinone is the basis of the chemical structure of all substances from this group (Figure 3).



9,10 - antrahinon

Figure 3. Structural formula of anthraquinone

After oral intake, anthraquinone derivatives are absorbed in the small intestine, transported by blood to the wall of the large intestine, where they activate the neurons of the myenteric plexus. This action of theirs leads to the appearance of colon contractions and defecation after 6 - 10 hours of taking the preparation. In our region, there are anthraquinone derivatives in the bark of buckthorn (Frangulae cortex), and the richest sources of these substances are the leaves of senna (Senna) and tree-like aloe (Alöe), plants originating from the Middle East.

d) Tannins

Chemically, tannins are polyphenols. Since their molecules are highly ionized, tannins lead to protein denaturation and precipitation. In smaller concentrations, they have an astringent effect (precipitate proteins on the surface of the damaged epithelium and create scrum, which then contracts due to water loss ; scrum tightly adheres to the surface of the tissue, so when it contracts, it produces pressure on it, reducing blood flow. Reduced blood flow helps establish hemostasis and leads to the calming down of inflammation symptoms.Tannin is found in most green plants (in the green envelope of young walnut fruits, oak and cherry bark, St. John's wort, yarrow, unripe fruit).

f) Mucilagines

Mucilagines are inert compounds chemically similar to polysaccharides. In contact with water, they swell and create a protective layer covering the mucous membrane. They are used as local cough suppressants (antitussives and to alleviate the unpleasant taste of other preparations). Mucuses are digestible, so they practically have no side effects). In our region, especially rich sources of mucus are the root of marshmallow (Althae radix) and thickening on the root of a species of orchid (Orchis mascula). The tuber of this early orchid with purple flowers is dried and ground to obtain flour called *salep* , which has been used in Bosnia for centuries to make sweets - salebija , and in Turkey and Greece, a hot drink that once replaced coffee . Since each orchid has two tubers, they remind people of testicles, so they mistakenly attributed the aphrodisiac effect to salep drinks and delicacies for centuries.

e) Fatty oils (Olea pinguia)

Fatty oils are esters of glycerol (or some other alcohol) and unsaturated fatty acids. These are mostly chemically indifferent substances that are used as bases for the preparation of medicines. Cocoa oil is used to make suppositories (Cacao oleum), and olive oil (Olivae oleum) is used as the basis of oil injections. The exception is castor oil (Ricini oleum); it is inert by itself, but when it reaches the lumen of the digestive tract, ricinoleic acid is released from it (under the action of lipase). Ricinoleic acid activates the neurons in the wall of both the small and large intestine , which results in defecation after 2-3 hours .

h) Essential oils (Aetherolea)

Essential oils (also called essential oils or essence) are complex mixtures of volatile substances which are synthesized by living organisms (both plants and animals) . According to their chemical composition, these substances can be ***terpenes*** (their basic building block is an isoprene hydrocarbon with a specific combination of double bonds: (CH_2=C(CH_3)-CH=CH_2)) and ***non-terpenes*** (oxidized substances such as aldehydes, alcohols, ketones, phenols, oxides). These substances generally have a pleasant smell and taste and, unlike fatty oils, do not leave a greasy stain on the paper. Although they are most often used to improve the taste and smell of medicinal preparations (as corrigents), essential oils have certain pharmacological effects in the body: they act as a mild antiseptic, antiphlogistic (against inflammation), carminative (reduce flatulence in the digestive tract) and can increase the secretion of saliva and gastric juice. In our country, there are plants that contain significant amounts of essential oils; one of the most widespread such plants in hilly and mountainous areas is thyme (Thymus serpyllum), which got its name from the exceptional smell of its oils. Lavender essential oil (Lavandula angustifolia) is also widely used.

z) Hormones

Hormones (insulin, thyroxine, somatotropic hormone) are the active principles of animal (or human) drugs - endocrine glands. Although medicinal preparations made from whole endocrine glands were used in the past (as real animal preparations), today hormone preparations have been purified to such an extent that we can no longer speak of animal preparations. In the future, most likely, all hormone preparations will be obtained by genetic engineering or chemical

synthesis, so the use of animal endocrine glands will almost completely cease.

2. CHEMICAL SUBSTANCES

Chemical substances are elements or compounds produced as such, not in the form of drugs. In order for a chemical substance to become a drug, it needs to be produced in a specific dosage form (e.g., as a tablet or solution) following the standards for the production of drugs (these are specified in the internationally recognized document "Good Manufacturing Practice") which guarantee that there is no contamination of the drug with harmful agents and that the active substance will be in a sufficient concentration and a sufficient degree of purity. In addition, the drug must undergo certain preclinical and clinical tests of its positive and adverse effects before receiving a marketing authorization from the national body responsible for drugs, which in Serbia is called the Agency for Medicines and Medical Devices. Therefore, while in the distant past a doctor could treat his/her patients with ordinary chemical substances, today this is not permissible if there is an approved drug with the same composition, because its effectiveness and safety have been previously verified.

3. GALENIC PREPARATIONS

Galenic preparations are medicinal preparations made by a pharmacist in a pharmacy from drugs and chemical substances using different procedures (mixing, extraction, dissolution, etc.) . In order for a pharmacist to prepare a medicinal preparation, he/she must first have the main drug - the substance that carries the pharmacological effect (for which the preparation is made). The main remedy is called **Remedium cardinale** (remedium = medicine , Latin). Another necessary ingredient of the galenic preparation is an indifferent substance that allows the preparation to be given in some form - **Remedium constituens (Vehiculum)** . Without constituents, it would not be possible to practically apply many of the main drugs , because their dosage forms would be too small : imagine a tablet that contains only the dose of the main drug and whose weight is only 10 mg?! The patient would have to look for such a pill with the help of a magnifying

glass and would never be sure if he had actually swallowed it! With the help of constituents (starch, sucrose, lactose, etc.), all tablets and other dosage forms have a similar mass and volume, regardless of the dose of the main drug.

In addition to the main drug and constituents, the medicinal preparation may contain an auxiliary drug that supports or completes the effect of the main drug (**Remedium adjuvant**). So, for example, in some medicinal preparations, in addition to penicillin with an extended spectrum of action (ampicillin), there is also an adjuvant substance (sulbactam) that, by inhibiting bacterial enzymes (penicillinase), prevents premature degradation of the main drug. Finally, the pharmacist can improve the taste or smell of his/her medicinal preparation by adding a substance with a pleasant smell and taste. We call such a substance **Remedium corrigens** .

A pharmacist used to be able to prepare medicinal preparations on the basis of instructions from the pharmacopoeia (for such preparations we said they were officinal), but today only on the basis of the instructions sent to him/her by the doctor, which is called a prescription (for such preparations we say they are magistral because they are prescribed by a doctor who used to be called ***Magister medicinae***).

4 . READY-MADE MEDICINES

Ready-made drugs are medicinal preparations produced by drug factories and which reach pharmacies (and then to patients) already ready for use. They are also called **pharmaceutical specialties**. Today, ready-made medicines make up the vast majority of medicinal preparations, with a constant tendency to increase in numbers. Their advantage is in simpler application and readiness for use. The main disadvantage of finished medicines are fixed doses in medicinal preparations; often the patient requires a lower or higher dose than the one offered by the drug manufacturer. In such cases, it is best to resort to making a galenic preparation from the finished drug which will contain the desired dose of the main drug. Such galenic preparations (where, for example, tablets of the finished medicine are crushed into powder and then supplemented with an inert powder and divided into smaller doses) are called **triturates** (trituration - mixing of two or more materials until the mixture becomes homogeneous).

Each drug has a so-called **international non-proprietary name** accepted by the World Health Organization (the Latin variant of that name represents the title of its monograph in the pharmacopoeia). The international name of the drug is also called **the generic name** . On the other hand, each factory that produces a ready-made preparation of a drug gives a name to that finished preparation at its own discretion. That name is protected by the law of the country where the drug factory is located, so none of the other drug manufacturers in that country can use that name for any of their preparations. That is why we call such a drug name **a protected or trade name** . It is marked with the letter R (Latin R) in a superscript (the initial letter of the word "registered" , which means registered in the register of ready-made medicines of the country in question). When several factories in a country produce the same drug, but sell it under different proprietary names, we call such ready-made preparations parallel preparations.

Although most often parallel preparations have the same pharmacological value, sometimes this is not the case because there are differences in the quality of production between factories. Among the parallel preparations, only one is the so-called the original medicine, i.e., a drug that, as a result of long-term laboratory and clinical research, was the first to be registered for human use. All others are actually copies of that original, and are called generic preparations. In order for copies to be registered for human use, it is necessary to prove their bioequivalence with the original drug. Bioequivalence is defined as the absence of a significant difference in the speed and degree in which the active substance from the original or generic preparation reaches the site of action, when the original or generic preparation is administered in the same dose and under the same conditions within a properly designed study.

Probably the first "registered" medicine in history was **Terra sigillata** (seal earth), which was produced since the 5th century BC. They were actually clay tablets originating from the Greek island of Lemnos. On a certain day each year, tablets were shaped from the washed, purified clay and handed over to the priests to put their stamp on. Then they were dried in the sun and sold. They were believed to help with almost all diseases!

Ready-made medicines can contain simpler, smaller molecules, which can be synthesized by relatively simple chemical procedures, so such ready-made medicines are considered **"chemical" or "classic"** .

Recently, complex macromolecules that normally exist in the human body (or are very similar to endogenous macromolecules) and have a very specific function are increasingly being used as medicines. Such macromolecules cannot be synthesized by a chemical process, but living organisms are used for their production, which have been forced to do so by genome changes (genetic engineering) or in some other way. Medicines - macromolecules, which are produced by living organisms, are called **biological medicines**. Their specificity is also that production batches are never identical to each other, but there are minimal variations that usually do not have a significant impact on the effectiveness and frequency of side effects.

5. SERUMS AND VACCINES

Serums are biological medicinal preparations that are extracted from the blood of animals or humans after their exposure to antigens. Serums contain significant titers of antibodies against microorganisms or against human antigens foreign to the patient to whom they are administered. They can be prepared from serum preparations containing only the gamma globulin fraction of the protein; we call such preparations gamma globulins. When gamma globulins are isolated from the serum of people who have been exposed to certain antigen (eg hepatitis B virus antigen), then such a preparation will have a high titer of antibodies against the relevant antigen, so we call it hyperimmune gamma-globulin.

Vaccines are medicinal preparations made from weakened (attenuated) microorganisms, from dead microorganisms or from parts of microorganisms whose task is to cause the human immune response to those microorganisms.

STORAGE AND LABELING OF MEDICINES

Medicines are stored and labeled in a number of ways depending on the potential of the medicine to cause unwanted effects in the patient. We divide all medicinal preparations according to the method of storage into the following groups:

1. Medicines with *very strong* actions (Remedia claudenda, Venena = poisons). Substances belonging to this group must be stored

in the pharmacy separately from other medicines and under lock and key. Containers in which these medicines are stored must be marked with the name of the medicine in question written in white letters on a black background and with the sign of a double cross (✞✞). Also, the maximum single and maximum daily dose of the medicine must be written on the container. Examples of drugs from this group are the cardiotonic glycoside digoxin and the antiarrhythmic amiodarone .

2. Medicines with *strong* effects (Remedia separanda = separate remedies). Medicines from this group do not have to be locked in the pharmacy, it is enough just to store them separately from other medicines. They are marked with a single cross (✞), and the name of the drug, the maximum daily dose and the maximum single dose must be written in red letters on a white field. Examples of drugs from this group are the central nervous system stimulant caffeine and the selective beta blocker bisoprolol.

3. Narcotic drugs are medicinal preparations that have a strong effect on the psychological functions of a person. That is why there is a pronounced tendency to abuse these drugs. Narcotic drugs must be kept under lock and key, in a separate room that is also locked. Containers of narcotic drugs are marked in the same way as very strong or strong drugs, with the addition of a double paragraph sign (§). Narcotic drugs include morphine, pethidine, phenobarbitone, methadone, buprenorphine and others. A detailed list of all narcotic drugs can be found in the acts of the Ministry of Health or the Government of the Republic of Serbia . When the doctor prescribes any of the narcotic drugs, he must give the patient a prescription and keep a copy of it with him; also, all information about the patient and the amount of medicine dispensed must be recorded in a special protocol that is kept in the doctor's office.

4. Radioactive drugs must be kept locked, in special lead boxes that absorb radiation. They are marked with a red radioactivity sign on a yellow field:

(The drawing is in the public domain, without known authorship, downloaded from: https://commons.wikimedia.org/wiki/File:Radiation_warning_symbol.svg)

5. Trigonics

These are substances that reduce the psychomotor ability of the patient. They are called trigonics because they are marked with a red triangle on a white field:

They are stored together with other medicines in the pharmacy (they do not need to be locked). When the doctor prescribes one of the trigonics, he is obliged to warn the patient that he must not drive a motor vehicle , nor work with devices that require good motor coordination. Otherwise, the patient may experience an accident for which the doctor who prescribed the medicine is directly responsible. Trigonics include antihistamines, neuroleptics, anxiolytics and others.

6. Other drugs (low-acting drugs) are stored in the pharmacy and are not locked separately. Inscriptions on containers containing medicines from these groups must be written in black letters on a white background. Most of these drugs can be bought in a pharmacy without a doctor's prescription, because due to their weak effect, the patient cannot be poisoned by them. The list of medicines, with the maximum permitted doses, which can be bought without a prescription, is determined by an act of the Ministry of Health or the Government . We call such drugs **OTC preparations,** which is an abbreviation of their name in Anglo-Saxon countries: **Over** the **Counter drugs** (drugs that are dispensed "through the cash register", i.e., for money, without a prescription).

PRESCRIPTION

A prescription is a written instruction in Latin for the preparation and dispensing of a medicine that a doctor sends to a pharmacist. Since it depends on the prescription what the pharmacist will issue to the patient and what instructions for use he/she will give, the prescription must be written *precisely* (according to all applicable

rules) and *legibly*. The name prescription comes from the Latin word ***praeceptum***, which means prescription. Only OTC drugs can be dispensed in a pharmacy without a doctor's prescription; all other medicines can only be dispensed with a prescription. A prescription can only be written by a doctor (but also a dentist or veterinarian) who has passed the state exam (therefore has the right to practice on the territory of Serbia).

Only one medicine can be written at one prescription! Exceptionally, one prescription can prescribe both a drug and its base (eg solvent), but then they must be separated by the following sign: #. If the prescription is long, so when writing it, you have to go to the back of the form, at the bottom of the first page, you should write the Latin word ***verte!*** (turn !). The recipe can only be written with blue or black ink (pen, " ballpoint " pen), and never with a graphite pencil, crayon or the like.

Any properly written recipe must have the following parts, listed in order:

1. Inscriptio (lat. = inscription)

The inscription is the first part of the prescription that contains information about the patient and the doctor. The following must be clearly stated: the name and surname of the patient, his age, his address, the health organization in which the medicine is prescribed, the patient's social registration number, the patient's registration number with the Republic Health Insurance Fund and the number of the health card (if he/she has health insurance), diagnosis code, doctor's code and the outpatient protocol number. If the prescription is prescribed in a private healthcare institution, it is sufficient to state only the first and last name of the patient, age, address, name of the institution, address of the institution and the first and last name of the doctor. This part of the prescription is usually filled out by a nurse or technician after the doctor writes the other parts. However, the doctor must check whether the inscription is written correctly, so that there is no unintentional replacement of the patient with potentially fatal consequences!

2. Invocatio (lat. = invocation)

This part of the recipe is only an abbreviation " **Rp** . " (from the Latin word ***recipe*** = take !). " Rp " is an abbreviation of the word in the imperative , which means that with it the doctor instructs the pharmacist to take the ingredients of the medicinal preparation (or

ready-made medicine), to make a medicinal preparation from them and to dispense the medicinal preparation to the patient. On recipes in ancient times, instead of the abbreviation " Rp." there was standing drawing of Asklepi's (lat . = Aesculap) rod (Figure 4). Asclepius was the Greek god of medicine. The drawing of the rod of Asclepius was simplified over time and began to resemble the Latin letter R, so in the Middle Ages it was understood that “Rp." Was abbreviation of the word *recipe* .

Figure 4. Rod of Asclepius

3. Ordinatio (lat . = order issued by the authorities)

Ordinatio is a part of the prescription that consists of the name of the medicinal preparation, the form of the medicinal preparation and the amount of the active substance (main drug) in that form. In the name of the medicinal preparation, nouns are written with a capital letter, and adjectives with a small letter. The form of the medicinal product (e.g., capsule, tablet, etc.) is always written with a small initial letter. When there is no Latin name for the form of the medicinal preparation (because that form has been in use since recently), the Serbian name can be written. The amount of active substance in the form of medicine is always written in grams or fractions of grams, in Arabic numerals. If, for example, there is 10 mg of the active substance in a tablet of a medicine, in the doctor's office it is written 0.01 without entering the mark for grams.

4. Subscriptio (lat. = note , remark)

A subscription is a short instruction to a pharmacist about preparing and/or dispensing a medicine. In it, it must be written ***how much*** of the medicinal preparation specified in the doctor's office the pharmacist should dispense to the patient, ***in what form*** it will be dispensed and (if it is a magistral galenic preparation) ***what form*** of medicinal preparation to make from the ingredients specified in the doctor's office.

5. Signatura (lat . = mark)

Signatura always begins with a Latin word in the imperative: ***Signa*** . (= mark). With this, the pharmacist is instructed to write in Serbian (that is, his/her native language) the instructions for the use of the medicine on the container in which he/she dispenses the medicine to the patient. In fact, the pharmacist only needs to copy the instructions, which, also in the native language, the doctor wrote after the word " Signa." " . In order to save time, the word Signa is often written only as initial capital letter S with a dot (**S.**). Instructions in Serbian language should be written comprehensibly, legibly and without unclear abbreviations. If the doctor wants the name of the medicine to be written on the container in which the medicine is dispensed (i.e., on the medicine package), then instead of the word " Signa" it should be written “Signa **suo nomine.**" which means " Label the medicine by its name ". If, on the other hand, the doctor wants the entire composition of the medicinal preparation to be written on the medicine package, then instead of the word " Signa" he/she should write ”Signa **cum formula.**" which means " Label the drug with its composition " .

The signature can be written entirely in Latin in the following cases:

a) if the doctor prescribes a medicinal preparation for parenteral administration (injections, infusions, etc.). Then behind the words Signa . " it should be written “**Ad manum medici”** (= In the hands of the doctor). This instructs the pharmacist to dispense the medicinal preparation to the patient and instruct him to go to the doctor again so that he/she can administer the medicine.

b) if the doctor prescribes a medicinal preparation for personal use. Then after the sentence " Signa suo nomine. " one of the following phrases should be written : " **Pro me.** " meaning "For me . " , or Ad **rationem meam.** " meaning "On my account." or “Ad **usum proprium.**" meaning "For own use" .

6. The doctor's signature, a stamp with the doctor's name and the stamp of the institution where the prescription was issued.

Apart from these mandatory parts, some other words or phrases in Latin can be written on the prescription. If the medicine needs to be dispensed as soon as possible, it can be written on the side of the prescription " **Cito!** " meaning "Quick ! " , " **Statium!** " meaning "Urgent!" or “Periculum **in mora!**" which means "Danger is in

procrastination!". The pharmacist must dispense the medicine prescribed on such a prescription immediately, regardless of all other tasks.

In the case of all medicinal preparations, the inscription, invocation and signature are written in a similar way. However, in writing other parts of the prescription, there are significant differences between magistral and ready-made medicinal preparations.

Prescribing finished (ready-made) medicines

Finished (ready-made) medicines are medicinal preparations produced by pharmaceutical companies. They arrive in pharmacies under a trademarked name, in their original packaging. That's why when we prescribe a ready-made medicine in the *ordinatio*, we write its trademarked (protected) name. We always write the protected name in the nominative singular, i.e., as it is written on the medicine package. We also write the form of medicine in the nominative case, with the fact that we can choose between the singular and the plural. If the medicinal preparation has only one main drug, then its quantity in the form of medicine (tablet, capsule, etc.) is written in the *ordinatio*. If there are several main drugs in the medicinal preparation, then the amount of the drug in its form is not written in the *ordinatio*.

Ready-made medicines are dispensed in their original packaging, so in the subscription we should write how many original packaging the pharmacist should issue to the patient. Subscription always starts with the word " **Da** " in the imperative , which means "Give it away" . If the medicine is packed in the original box , it is written " **Da scatulam originalem N º I (unam)** " (Issue one original box) if we prescribe only one box to the patient , and " **Da scatulas originales N º II (duas)** " (Issue two original boxes) if we prescribe two boxes of medicine to the patient . Noun "scatula" and an adjective " originalis " are always written in accusative , in the singular if one box is prescribed, and in the plural if two or more boxes are prescribed . "**Nº**" is an abbreviation of the Latin verb " **Numero** " which means "to count".

The number of boxes that we prescribe to the patient is written in Roman numerals, with the fact that we must always write the name of the number in parentheses (to prevent misuse or abuse). Only the names of the numbers one, two, three and hundred change according to

case, so they should be written in the accusative case (unam, duas, tres and centum), while the names of the other numbers are unchanged. If the medicine is packed in a tube, then we use the Latin name " **tuba originalis** " in the subscription, if it is packed in a bottle, then the name is written " **lagena originalis** ", and if it is a cardboard roll, then it is written " **phiola originalis**". Of course, all these names should be written in the accusative case, according to the same principle as the name " scatula originalis" . If we do not know what the medicine is packed in, it can be written in the subscription " **Da occlusionem praeformatam N º I (unam)** " or " **Da oclusiones praeformatas N º II (duas)** " which means " Issuing one original package " or " Issuing two original packages" . The Latin names of the numbers are listed at the end of the book, in the "Appendix" section .

How the prescription of ready-made medicines looks in practice can be seen on the example of acetylsalicylic acid. One of the producers of acetylsalicylic acid is the company "Pliva" from Croatia, which packs acetylsalicylic acid in original boxes called " Andol " , in the form of 300 mg tablets . If we want to prescribe one box of " Andol " tablets , then we should write the following prescription:

Rp.
Andol tabllettae 0.3
Da scatulam originalem N º I (unam)
S. Mix one tablet in a glass four times a day
water and drink it.

How other ready-made medicines are prescribed can be seen in the " Examples" section .

Prescribing magistral drugs

Magistral drugs are medicinal preparations made by a pharmacist according to a doctor's prescription. When we prescribe a magistral preparation, we must write everything in the prescription: the ingredients of the preparation and their amounts; method of preparation; in which package medicinal preparation should be dispensed. In the *ordinatio*, all substances that make up the medicinal preparation should be listed, one below the other. First you should write the name of the main drug, then the names of adjuvants and corrigents (if any) and finally the name of the constituent. The names of all these substances are written in the genitive case, followed by their quantities expressed

in Arabic numbers. In the subscription, you should first write how the medicinal preparation is made from the mentioned ingredients. As the ingredients are often mixed, usually the signature begins with the expression " **Misce fiat** " , which means "Mix it to be" . If the doctor does not write " **Misce fiat** " the pharmacist could misunderstand that he should dispense the ingredients of the medicine *separately* ! This term is followed by the form of the medicine: ointment (**Misce fiat unguentum**), solution (**Misce fiat solutio**), emulsion (**Misce fiat emulsio**) or other . If a preparation for parenteral administration is prescribed, it must be written " **Sterilisa** " meaning "Sterilize" . In the next line of the subscription, you should write in what package the pharmacist must dispense the medicinal product. Most often it is a box (**Da ad scatulam**), but it can be a bottle (**Da ad lagenam**), a bottle (**Da ad vitrum**) or a bag (**Da ad sacculum**). Below the subscription follows the *signatura*, which is written as usual, in the Serbian language. What a prescription of magistral drug looks like can be seen on the example of bismuth-subgallate, a useful astringent for external use.

Rp.
Bismuthi subgallatis 10.0
Talci ad 100.0
Misce fiat pulvis.
Da ad scatulam.
S. Outside, sprinkle the affected areas three times a day .

FORMS OF DRUGS

Medicines can be prepared in many forms. Which form of medicinal preparation the doctor will prescribe to the patient depends primarily on the route of administration of the medicine, but also on the speed with which the medicinal substance should reach the site of action. Some forms of medicine release the active substance faster, and some more slowly. The needs of the specific patient are always the decisive factor for choosing the form of the medicinal preparation.

TABLETS
(Tablettae)

Tablets are solid medicinal preparations in the form of tiles, round or oval in shape, smooth, flat or convex surfaces, sharp or rounded edges, containing a single dose of one or more medicinal substances, and are produced by compressing a certain volume of powder, microcrystals or granules.

Apart from the main drug, tablets always contain a constituent (simple sugars, starch or something else) and a swelling agent (agar or starch) which allows the tablet to disintegrate after contact with water and thus release the medicinal substance. In addition, the tablets can also contain agents for binding, sliding, odor and taste correction, coating, coloring and more.

A well-made tablet must meet the following mechanical conditions: (1) be solid (not break when dropped from a height of 1-1.5m onto a wooden surface), (2) be disintegratable (two tablets in a glass of water of 50 ml at 37 °C should completely disintegrate within 15 minutes). It must have the same concentration of the active substance in all parts, which must always dissolve in water in the same amount of time (solubility test).

The good feature of the tablets is that they contain the exact dose of the medicinal substance, and the bad thing is that they cannot be taken by children under 8 years of age and people with impaired consciousness. A change in the color of the tablet indicates that the medicinal substance has expired. Tablets are stored in well-closed containers to avoid breakage.

All tablets can be classified into one of the following groups:

1. **Uncoated tablets**
2. **Coated tablets.** There are several special types of coated tablets. **Dragees** (French dragees) are tablets coated with a protective layer (sugar, chocolate, gelatin) for the purpose of correcting an unpleasant smell or taste and delaying the disintegration of the tablet until it reaches the small intestine. Dragees in water should disintegrate in 60 minutes. **Film-**

coated tablets are tablets coated with a very thin film, which should prevent the tablet from disintegrating until it reaches the duodenum. Medicinal preparations that irritate the gastric mucosa (e.g., oral iron preparations) are most often made in the form of film-tablets.

3. **Effervettes** (effervettae, "effervescent tablets") are not swallowed, but are used to make a quick drink. Apart from the other essential ingredients of each tablet, efferves contain citric acid and sodium bicarbonate. In contact with water, citric acid and sodium bicarbonate react so that unstable carbonic acid is formed, which decomposes into carbon dioxide and water. The carbon dioxide created is released in the form of bubbles and thus mechanically accelerates the disintegration of the tablet.
4. **Dispersible tablets** are tablets that are dispersed in water before use and give a homogeneous suspension .
5. **Tablets with modified release of the active substance or retarded tablets** (durulae, double-coated tablets) contain a core covered with a material that is relatively resistant to digestive juices and a coating. Both the core and the shell contain an active substance; the coating disintegrates already in the duodenum, and the core in the small intestine, only after some time (several hours). The use of *durulae* ensures continuous absorption of the active substance in the digestive tract, which is necessary for drugs that are rapidly metabolized in the body (e.g., nitrates). A special subtype of this type of tablet are gastro-resistant tablets, which are either coated with a gastro-resistant layer, or created by compressing granules previously coated with a gastro-resistant layer
6. **Tablets for use in the mouth** are uncoated tablets, which are not swallowed, but disintegrate in the oral cavity. They are intended for local or systemic administration of drugs. ***Oriblets*** (oriblettae) are tablets that are not swallowed, but only sucked. They disintegrate in the oral cavity where the medicinal substance exerts its local effect. ***Sublingual tablets*** (lingualettae) and ***buccal tablets*** (bucalettae) are also not swallowed but are placed under the tongue (lingualettes) or between the gingiva and cheek mucosa (bucalettae). They disintegrate in the mouth and the medicinal substance is

absorbed into the bloodstream through the mucous membrane of the oral cavity. In this way, the medicine reaches the blood quickly (so its action starts quickly) and bypasses the liver during absorption, because the blood from the oral cavity flows into the heart via the superior vena cava. In the form of sublingual tablets or buccalette, only drugs are applied that are soluble in lipids (so they can be resorbed through the squamous epithelium of the oral cavity) and that are metabolized in the liver already on the first pass, so that their application in the form of an ordinary tablet would not lead to significant concentrations of the drug in the blood (e.g., nitroglycerol). Chewable tablets also belong to this group.

7. **Implants** (tablettae hypodermicae) are surgically implanted into the subcutaneous tissue from where they release a medicinal substance (e.g., estrogens) over several years.
8. **Pufferettae** are ordinary tablets that, in addition to other necessary ingredients, contain a substance with buffering properties. This substance partially neutralizes the acid from the gastric juice, which reduces the gastric absorption of weak acids (e.g., acetylsalicylic acid), which become more ionized. By reducing the penetration of such drugs into the gastric mucosa, their toxic effect is reduced (for example, acetylsalicylic acid causes erosive gastritis in 10-15% of patients, sometimes accompanied by bleeding), so such drugs are easier to tolerate.
9. **Vaginal tablets** (vaginalettae) are triangular or drop-shaped tablets that are applied locally in the vagina. In the vagina, the tablets disintegrate and the released medicinal substances act locally, on the vaginal and cervical mucous membranes, or are absorbed into the blood and exert an effect on the uterus as well. Vaginalettes are applied in the evening, in bed, with the help of a plastic applicator in order to reach the vaginal vaults.

Most of the drugs that are administered in the form of tablets are finished (ready-made) drugs, because the production of quality tablets is a technologically demanding process that can only be provided by pharmaceutical companies. When we prescribe tablets in *ordinatio*, it is allowed to write the abbreviated " tabl ." instead of " tablettae" . Allopurinol is a drug that inhibits xanthine oxidase, which

leads to a decrease in the concentration of uric acid in the blood and prevents the deposition of crystals of this acid in the tissues. Allopurinol is used to prevent gout attacks. Ready-made preparation of allopurinol called " Allopurinol Belupo " is administered orally , in a dose of 100 mg every 8 hours .

Rp.
Alopurinol Belupo tablettae 0.1
Da tales tablettas N º L (quinquaginta)
S. Take one tablet every 8 hours, after a meal.

SOLUBLETES
(Solublettae)

Solubletes are solid medicinal preparations in the form of square or round tablets that are used to make solutions for external use. In addition to the main medicinal substance and constituents, solubletes always contain swelling agents that enable rapid disintegration of the tablets in water (in 10-15 minutes). If the solubletes contain drugs with a very strong effect (☥☥), they must be colored blue and wrapped in black paper with a white scull drawn, the word "Poison" and the amount of the drug. Solubletes are usually prescribed and dispensed as one piece. If we want to prescribe two solubletes, then in the subscription we write: " **Da tales solublettas N º II (duas)** " ("Issuing two such solubles"). If solubletes contain a drug with a very strong effect, then we write: " **Da tales solublettas sub signo veneni No II (duas)** " ("Issuing two such solubletes with the mark of poison"). The solubletes that can be found on our market are Burow's solubletes.

The preparation of Burow's solubletes consists of two solubletes per one dose, one of which is blue and the other white. The blue solublete contains lead-acetate, and the white solublete contains aluminum-potassium-sulfate. When both solubletes are placed in water, they dissolve and their constituents react with each other, creating aluminum-monobasic acetate. This last substance has an anti-inflammatory, antiseptic and astringent effect, so in the liquid in which Burow's solubletes are dissolved, a dressings are soaked, which are then placed on parts of the body affected by inflammation, where the continuity of the skin is not interrupted .

CAPSULES
(Capsulae)

Capsules are solid medicinal preparations in the form of shells filled with solid, pasty or liquid medicinal substances for oral administration. There are two basic types of capsules: one-part capsules and two-part capsules that slide into each other (Capsulae operculatae = capsules with a lid).

Capsula operculata

One-part capsules are always made of soft material, so they are also called ***soft capsules***. They are always filled with liquid or pasty medicinal substances. Capsules from two parts are always made of hard material, so they are also called ***hard capsules*** .

In the past, depending on the type of material they were made of, capsules were divided into:

a) capsulae amylaceae - capsules made of starch. They are white shells, usually in two parts. They release the medicinal substance already in the stomach because they are broken down by amylase from the saliva.

b) capsulae gelatinosae - capsules made from a mixture of gelatin, glycerol and water. These are transparent or yellowish capsules, soft, usually from one part. If they contain more glycerol, they become very elastic (capsulae gelatinosae elasticae). They are more resistant

than starch capsules, so their decomposition starts in the stomach and ends in the small intestine.

v) capsulae geloduratae - white or yellowish capsules that disintegrate only in the small intestine, in an alkaline environment. They were obtained by immersing gelatin capsules in a 1% solution of formaldehyde in ethanol for one hour. Capsulae geloduratae were previously used for drugs that irritate the gastric mucosa.

Today, thanks to modern technology, all capsules are made of gelatin, both hard and soft. If gelatin capsules are coated with a layer that is resistant to gastric juice, or filled with granules or pellets that are coated with a layer resistant to gastric juice, such capsules are called **gastro-resistant**. They release the medicinal substance only in the small intestine. If, on the other hand, gelatin capsules are coated with a special layer, or filled with specially processed content, they can release the active substance in a delayed manner; such capsules are called " **capsules with modified release of medicinal substance** " .

Capsules make it possible for the patient not to feel the unpleasant smell or taste of the medicinal substance and reduce damage to the gastric mucosa. The patient should be warned not to chew or open the capsules. Antibiotics for oral administration are most often prepared in the form of capsules, precisely because of the unpleasant taste and smell.

Azithromycin is an antibiotic that acts on numerous gram-negative and gram-positive bacteria. In addition to bacteria, it works on mycoplasmas and chlamydia. Due to high tissue affinity and slow elimination, it is administered only for 3 days in total, one dose of 500 mg per day, orally. The most common indication for the use of azithromycin is community-acquired pneumonia. It can be prescribed as a ready-made medicine " Sumamed ^{R} " who is produced by the factory " Pliva " from Zagreb:

Rp.
Sumamed capsulae 0.25
Scatulam originalem N ^{o} I (unam)
DS Take two capsules once a day, one hour before or two hours after meals. The therapy lasts only 3 days.

GRANULES

(granules)

Granules are solid medicinal preparations in the form of granules of different shapes and sizes, intended for oral use. They can be chewed, swallowed directly, or dissolved in water before administration. They contain one or more medicinal substances. They may also contain auxiliary substances (constituents, corrigents). The granules must not be stuck to each other, nor crushed during normal handling.

Granules can be divided into:

1. **Effervescent (effervescent) granules** , which, in addition to the medicinal substance, contain acid and sodium bicarbonate. In contact with water, a reaction of acid and bicarbonate occurs, and carbonic acid is formed, from which carbon dioxide is quickly released, which accelerates the disintegration of the granules. Before use, the effervescent granules should be mixed in a glass of water and wait for the bubbles to stop forming.
2. **Coated granules** are coated with some auxiliary material, e.g. with a corrigens.
3. **Gastro-resistant granules** are coated with an acid-resistant layer, so they only disintegrate in the small intestine.
4. **Granules with a modified release of the medicinal substance** are made in such a way that they release the medicinal substances at a certain place or during a certain period of time (such a slow, gradual release ensures a longer-lasting effect).

Granules can be packaged as divided (ie, single-dose) preparations (each dose is separately packed in a bag) or as undivided (ie, multi-dose) preparations, but with a teaspoon or scoop for measuring individual doses.

POWDERS
(Pulveres)

Powders are solid forms of medicines obtained by grinding drugs and chemical substances and sifting them through prescribed sieves. Depending on the composition and method of production, powders are divided into:

a) pulveres mixti (mixed powders) - powders containing several different substances.

b) pulveres standardizati (standardized powders) - with them, the concentration of the active substance is exactly known (standardized). They usually contain strong active substances.

c) pulveres stabilisati (stabilized powders) - powders made from fresh plants in which enzymes have been previously inactivated. This prevents spoilage of the powder, i.e., the powder becomes stabilized.

According to the method of application, we divide all powders into powders for external application and powders for internal application.

Powders for external use

(Pulveres pro usu externo seu Pulveres ad usum dermicum)

Powders can be used for sprinkling skin or wounds (conspergentia), for blowing into natural openings of the body (nose, external ear canal, throat, etc.) and for making solutions for external use. Talcum is usually used as a constituent of powders for external use (talcum - a purified natural mixture of magnesium hydrosilicate and aluminum silicate; it is a white, fine powder, greasy under the fingers, odorless and tasteless.). They are usually prescribed in the amount of 20 to 100 g and issued in a bag (sacculum) or in a box (scatula). If the powder is hygroscopic, then it is dispensed in a bag impregnated with wax (charta cerata). Powders that are blown into the body's natural openings are applied with the help of a sprayer - a glass tube with a rubber balloon at one end. If the powder is applied to the conjunctiva, then a special brush with which the powder is applied must be prescribed to the patient along with the powder. Then in the subscription of the recipe it is written : **Da cum penicillo** (Issuing with a brush). The *signatura* of the prescription prescribing the powder for external use always begins with the word " External ," so that the pharmacist can emphasize to the patient that the dispensed powder must not be swallowed. Patients can be prescribed bismuth-subgallate, a mild antiseptic and astringent (an excellent remedy for treating skin erosions) in the form of a dusting powder.

Rp.		
Bismuthi subgallatis		5.0
Talci	ad	50.0

Misce fiat pulvis.
Da ad sacculum.
S. Outside, sprinkle the affected areas twice a day .

Powders for internal use

(Pulveres pro usu interno seu Pulveres peroralia)

Powders for internal use are administered orally. Sucrose or lactose are used as constituents (lactose is always used when the main drug is hygroscopic, because it does not bind water from the air). They can be prescribed as "**undivided powders**" (the pharmacist then dispenses the entire amount of powder to the patient and the patient measures out the individual dose) and " **divided powders**" (the pharmacist must first divide the prescribed powder into individual doses and only then dispense it to the patient). Medicines with a weak effect can be prescribed as "**undivided powders**" , because even if the patient makes a mistake and swallows the entire amount of powder at once, serious poisoning will not occur . All other drugs must be prescribed as "**divided powders**".

Prescribing undivided powders

If we prescribe a powder for internal use " undivided " , then in the doctor's office we write the total amount of ingredients, and in the prescription we instruct the pharmacist to mix the ingredients and give the powder to the patient in a box (scatula) or paper bag (sacculum). The signature must be written with precise instructions to the patient on how to dose the powder himself. Usually, objects that every patient has at home are used for dosing: a small (coffee) teaspoon or a knife. We will write, for example: " Three times a day take one full teaspoon (small spoon) of powder " or " Twice a day take one flat teaspoon of powder " or " Three times a day take the tip of a knife " or something similar. The volume of powder that fits on the " *tip of a knife* " is two times smaller than a " *flat teaspoon* (small spoon, coffee spoon) " and three times smaller than a " *full teaspoon* " . The doctor should always keep in mind that the same volumetric unit of measurement (a full teaspoon, a flat teaspoon or the tip of a knife) contains a different mass of different drugs, depending on their specific gravity. So, for example, one flat teaspoon (small spoon, teaspoon) contains only 0.3 g of magnesium oxide, and as much as 4 g of sodium chloride! Therefore,

when writing the *signatura*, one must know how many grams of the drug (i.e., what mass of the drug) the " *measure* " with which the patient will dose the powder contains. The very effective osmotic laxative magnesium sulfate can be prescribed as an undivided powder.

Rp.
Magnesii sulphatis 40.0
Da ad sacculum.
S. Three full coffee spoons dissolve in a glass of water and drink at once *.

* One full coffee spoon has about 5 g of magnesium sulfate .

Prescribing divided powders
(Dosipulveres)

Medicines with a strong or very strong effect can only be prescribed as divided powders. In the prescription, the doctor must instruct the pharmacist to dispense the powder to the patient already divided into individual doses. This eliminates the possibility of an error in measuring the individual dose that the patient could make. One dose of powder usually has a mass of 0.3 g to 0.5 g, and exceptionally up to 1 g.

Divided powders can be prescribed in two ways:

a) According to the divisional method - In the *ordinatio*, the total quantities of the ingredients of the powder are prescribed. In the *subscriptio*, the pharmacist is instructed to mix the ingredients, then divide them into a certain number of equal doses and dispense them to the patient. The mixed powder of magnesium oxide and sodium bicarbonate (used as an antacid - to neutralize stomach acid) can be prescribed magisterially by the division method as following :

Rp.
Magnesii oxydi
Natrii hydrogencarbonatis aa 10.0
Misce fiat pulvis.
Divide in doses aequales N º XX (viginti) *
S. Three times a day drink one powder between meals .

* aa = ana partes aequales (in equal parts - means that you should take the same amount of both ingredients listed in the prescription: 10 g of magnesium oxide and 10 g of sodium bicarbonate).

Divide in doses aequales N º XX (viginti) = Divide into twenty equal doses

b) According to the dispensing method - In the doctor's office, the quantities of the ingredients that go into one dose of the powder are written down. The prescription instructs the pharmacist to first mix the ingredients and then to dispense a certain number of doses to the patient.

The same mixed powder of magnesium oxide and sodium bicarbonate can be prescribed magisterially according to the dispensing method:

Rp.
Magnesii oxydi
Natrii hydro gencarbonatis aa 0.5
Misce fiat pulvis.
Da tales doses N º XX (viginti) *
S. Drink one powder three times a day between meals .

* Da tales doses N º XX (viginti) = Issue twenty such doses .

LIQUID PREPARATIONS
(Liquida)

Liquid preparations can be **solutions, mixtures , suspensions , emulsions or syrups.** They are divided into liquid preparations intended for oral use (Liquida peroralia) and liquid preparations intended for application to the skin (Liquida ad usum dermicum).

DRUG SOLUTIONS
(Solutions medicinales)

Drug solutions are clear liquid preparations containing the main drug dissolved in a suitable solvent. Solvents can be: water, ethanol, glycerol and oils (vegetable or mineral). The water used to make the solution must be distilled or demineralized (aqua purificata). Of the oil solvents, olive oil is used the most.

Solutions are dispensed in glass or plastic bottles (vitrum). Drug solutions can be intended for external or internal use .

Solutions for internal (oral) use

Medicines are prescribed in the form of a solution for internal use only if administration in the form of a tablet or capsule is not possible. It happens when the drug is intended for children under 8 years of age (tablets or capsules cannot be administered to them due to the high risk of aspiration), when the drug is in a liquid aggregate state at room temperature or when the drug is too hygroscopic. Solutions must always be freshly prepared for use because they spoil quickly (that's why a quantity sufficient for only 3-5 days is prescribed). The pharmacist dispenses the entire amount of solution in a glass bottle to the patient, and the patient measures the individual dose himself. A large and a small spoon (teaspoon) are used for measuring. It is assumed that a large spoon takes 15 ml of liquid, and a small spoon 5 ml. That is why the doctor, when prescribing a solution of medicine for internal use, must adjust the ratio of the main medicine and the solvent in the office so that the individual dose of the medicine is contained in 5 or 15 ml. Here's what the prescription for an effective potassium iodide expectorant solution looks like :

Rp.
Kalii iodidi 3.0
Aquae purificatae ad 50.0
Misce fiat solutio.
Da ad vitrum nigrum.
S. Stir one teaspoon of the solution three times a day in a glass of water and drink.

* Since one teaspoon contains 5 ml of solution , it will contain 0.3 g of potassium – iodide, which represents mean individual dose .
ad = to ; Da ad vitrum nigrum = Dispense in a dark bottle (because potassium - iodide is sensitive to light)

Solutions for external use

Solutions for external use are used for skin disinfection, for rinsing cavities (wounds, oral cavity, vagina, urinary bladder) and for preparing poultices. They are issued in glass bottles, usually in a higher concentration than the one in which they should be applied.

Therefore, in the *signatura*, after the word "Outside", the doctor must write instructions to the patient on how to dilute the solution before administration. A large spoon (15 ml) or a glass that holds between 150 and 200 ml are used as suitable " measures " .

If the solution for external use contains substances with a very strong effect, it must be colored bright blue. One of the ready-made disinfectant solutions is a solution of polyvinylpyrrolidone iodide, which is used to clean the operating field and disinfect the surgeon's hands:

Rp.
Povidone iodine 10% solutio 500.0
Da occlusionem praeformatam N ^{o} I (unam)
S. Externally, mix 100 ml of the solution in 900 ml of sterile distilled water. The skin of the hands can be disinfected with such a diluted solution.

MIXTURES
(Mixturae)

Mixtures have several substances in one solvent (which are usually completely dissolved, but do not have to be) or mixtures of substances that are liquid at room temperature. The essence of mixtures is that the mixed substances do not chemically react with each other. They are usually clear or slightly cloudy. With some mixtures, a precipitate appears after standing . When prescribing such mixtures in the signature, among other things, you should write " Shake before use!" " . That is why mixtures with sediment are called " Mixturae agitandae " .

Everything that applies to the prescription of drug solutions also applies to the prescription of mixtures. Mixtures can be intended for both external and internal use.

SUSPENSIONS
(Suspensiones)

Suspensions are liquid medicinal preparations in which the main drug is finely divided and suspended in a liquid base in which it does not dissolve. They can be intended for external use (then they are often called " liquid powders ") or for internal (oral) use (then they are called " medicinal suspensions " or " suspensiones medicinales "). After standing for a long time, the suspended substance settles at the bottom

of the bottle. Before each use, the suspension must be shaken vigorously in order to distribute the particles of the main drug as evenly as possible. Mucilaginous substances are often added to suspensions to slow down sedimentation (most often Mucilago Gummi arabici = Arabic gum, obtained by cutting branches or stems of plants from the acacia group). When prescribing suspensions, it must always be written in the signature, among other things, " Shake before use!" " .

When it comes to suspensions for internal use, the main drug must not be from the group of drugs with a very strong effect; since the main drug is never distributed evenly in the suspension, the variability between individual doses is so great that some of them may enter the toxic dose range. Suspensions for internal use are dosed in the same way as solutions - using a small and a large spoon.

Sulfur has been used for centuries to treat fungal skin infections and eradicate scabies. Since it is practically insoluble in water and alcohol, it is prepared in the form of a 10% suspension for external use:

Rp.
Sulfuris praecipitati 15.0
Talci 60.0
Glyceroli
Aethanoli diluti aa ad 150.0
Misce fiat suspensio.
Da ad vitrum collo amplo. *
S. Externally, apply once a day to the affected areas of the skin. Be sure to shake before use!

* aa ad = ana partes aequales ad (in equal quantities add glycerol and diluted ethanol /70%/ so that the total volume of the suspension is 150 ml)

Da ad vitrum collo amplo = Dispense in a bottle with a wide neck (if dispensed in a bottle with a narrow neck, the suspension may clog the opening due to sedimentation on the neck).

Bismuth salts have been used for almost two centuries to treat ulcers. As they are insoluble in water, they are applied in the form of suspensions for internal use:

Rp.
Bismuthi subcarbonatis 5.0
Mucilaginis Gummi arabici 30.0
Aquae purificatae ad 150.0
Misce fiat suspensio.

Da ad vitrum collo amplo.

S. Shake before use. Take a large spoonful of medicine three times a day.

EMULSIONS
(emulsiones)

Emulsions are medicinal preparations consisting of two liquids that normally do not mix, but here with the help of a third substance (emulsifier) they are homogeneously distributed in each other. One of the mixed liquids is actually distributed as fine particles in the other. A liquid in the form of small particles is called the dispersed phase, and a liquid in which the particles are distributed is called the continuous phase. One of the liquids is always water, and the other is usually oil or some other fatty substance. The emulsifier is usually arabic gum, but tragacanth (tragacanth = dried juice of the Astragalus tree that grows in Asia Minor), egg yolk, gelatin and others are also used. The main drug is dissolved in one of the liquids (phases) depending on its lipo- or hydro - solubility. Emulsions are applied orally or externally, on the skin. Medicines that have a particularly unpleasant taste or smell are prepared in the form of emulsions because they are easier to take. The downside of emulsions is their instability - they spoil in a few days, especially in summer .

Figure 5. Castor

The oil obtained from the seeds of the *Ricinus communis plant* (picture 5) is a very effective laxative that works for about 2 hours after ingestion.

Rp.
Ricini oleum 20.0
Gummi Arabici 10.0
Aquae purificatae ad 100.0
Misce fiat emulsio.
Da ad vitrum collo amplo.
S. Shake first, then drink the entire amount .

SYRUPS
(Sirupus)

Syrups are liquid, viscous medicinal preparations that contain at least 45% sugar (most often sucrose).

They are used exclusively orally. Medicines intended for children and medicines for adults with an unpleasant taste or smell are made in the form of syrup. The simplest syrup is Sirupus simplex, which contains only 45% sucrose in 100 ml of distilled water. If other substances are added to that basic syrup that further improve the organoleptic properties, then we are talking about complex syrups that get their name from the added substance. They are like that *Citri sirupus* (ordinary lemonade) or *Cinnamomi sirupus* to which sweet aromatic oil from the bark of the Cinnamomum zeylanicum plant, known in our country as Cinnamon, has been added. Today, most syrups are made in the form of ready-made medicines.

One such preparation contains as the main drug butamirate, a synthetic antitussive with predominantly central action:

Rp.
Omnitus sirupus 200 ml (4 mg/5 ml) *
Da lagenam originalem N ^{o} I (unam)
S. Give the child to drink 1 cup three times a day
teaspoon syrup*

* The dose refers to a 3-4 year old child .

SUPPOSITORIES
(Suppositoria)

Suppositories are soft medicinal preparations in a conical, spherical, cylindrical or egg shape that are used to insert into body openings (anus, vagina, nose, ear, wound). At room temperature, they are more solid, which allows them to be used. In contact with the body, the temperature of the suppositories rises and they melt, releasing the medicinal substance.

Suppositories can only be stored at room temperature; if they are stored in the refrigerator, there are irreversible changes in the constituents and the suppositories become brittle and unusable! Since they are easily damaged, the suppositories are sold wrapped in wax paper or foil. The patient should always be reminded to remove the foil before applying the suppository and not to swallow the suppository! There are three basic types of suppositories:

1. Suppositoria analia - suppositories for anal use. They are about 3 cm long and about 1 cm wide. Constituents of anal suppositories can be cocoa butter (Oleum Theobromatis), polyethylene glycols or a mixture of gelatin and glycerol. Anal suppositories are applied by pushing them into the anus with a finger until they pass the anal sphincter; a sign that the suppository has been applied correctly is that it cannot be felt from the outside. Medicinal substances are applied in the form of suppositories when we want a local effect on the anal canal and when we want the medicine not to irritate the mucous membrane of the stomach or to bypass the liver during absorption (because the venous blood from the anal canal and the lower 1/4 of the rectum flows into the lower hemorrhoidal veins, which through v. iliacae internae et communis they flow into the inferior vena cava). Nonsteroidal anti-inflammatory drugs that have the ability to irritate the gastric mucosa are often administered in the form of suppositories.

2. Globuli vaginales (Ovula, Vagitoria) - suppositories for vaginal use. They are round or egg-shaped, larger than the anal plugs. The constituents of vaginal suppositories are the same as those of anal suppositories. Vagitoria should disintegrate after 60 minutes of application .

3. Cereoli (Bacilli medicati seu Styli) - these are sticks for use in the nose, external ear canal, urethra, wounds or sinuses. They are thinner than anal plugs, cylindrical and pointed at the ends. The constituent is similar to the constituent of anal suppositories. They are used when a local drug effect is needed. Sticks that are inserted into the urethra or wounds must be sterile.

If we prescribe suppositories magisterially, then we can do it in two ways: **divisionally** or **dispensationally** . If, for example, we want to prescribe 10 suppositories with a non-steroidal anti-inflammatory agent using the division method, in the office we write for each of the ingredients the total amount for all 10 suppositories. In the subscription, we instruct the pharmacist to mix all the ingredients, then to divide the resulting mass into ten parts and make a suppository from each part.

Rp.
Ibuprofen 2.0
Cacao Olei ad 20.0
Misce.
Divide in doses aequales N º X (decem)
Fiat suppositoria analia.
D.*S. Externally, three times a day, put one suppository in the mouth.

* D. is an abbreviation of the word "Da", which means “give”.

Much more often, suppositories are prescribed magisterially according to the dispensing method. There, in the *ordinatio*, we prescribe the quantities of all the ingredients that go into the composition of just one suppository. Then, in the subscription, we write to the pharmacist how many such suppositories (doses) to issue. The same medicine is written as follows according to the dispensing method:

Rp.
Ibuprofen 0.2
Cacao Olei ad 2.0
Misce fiat suppositoria analia.
Da tales doses N º X (decem)
S. Externally, three times a day, put one suppository in the throat.

RECTAL PREPARATIONS
(Rectalia)

By rectal preparations we mean all medicinal preparations that are applied in the rectum (rectum), with the aim of acting locally or systemically. There are the following types of rectal preparations: (1) suppositories, (2) rectal capsules, (3) liquid preparations (ointments and gels), (4) enemas, (5) rectal foams, and (6) rectal tampons. Everything has already been said about suppositories, herbal preparations and enemas in other parts of the book.

Capsules for rectal administration are made of gelatin, as well as capsules for oral administration; unlike the latter, rectal capsules are coated with a layer of lubricant, for easier application.

Medicinal foams (Musci medicati) are preparations that contain a large volume of gas dispersed in a liquid. A mandatory ingredient of every foam is a surface-active substance (surfactant), which enables the formation of foam. They are usually packaged in pressurized bottles so that the foam comes out when the valve on the bottle is activated.

Medicated tampons (Tamponae medicatae) are solid medicinal preparations consisting of cellulose, collagen or silicone, impregnated with a medicinal substance. They are intended for short-term insertion into the rectum or other body cavities.

VAGINAL PREPARATIONS
(Vaginalia)

Vaginal medicinal preparations include all preparations that are applied in the vagina, with the aim of achieving a local effect. There are the following vaginal preparations: (1) globuli vaginales, (2) vaginal tablets (vaginalettae), (3) vaginal capsules, (4) vaginal foams and (5) vaginal tampons. Globuli vaginales and vaginalettae have already been discussed, while for vaginal capsules, foams and tampons everything that has been said for the corresponding rectal preparations applies.

ENEMAS
(clysmata)

Enemas are liquid medicinal preparations that are administered rectally. First, with a rectal touche (digital examination), it is determined that the ampoule of the rectum is empty and without pathological changes. Then, a soft rubber hose is introduced through the anus into the rectum, which is pushed gently until resistance is felt. The rubber hose is connected to the irrigator (a vessel with a side opening at the bottom) through a 1 m extension, into which an enema heated to 37 ^{o}C has been previously poured. A cold enema is extremely unpleasant for the patient. By raising the irrigator above the bed in which the patient is lying, the speed of liquid inflow into the rectum is regulated (the speed should be low, so that there is no sudden stretching of the distal colon and premature expulsion of the enema). Depending on the composition, enemas are divided into three types.

a) Nutrient enemas (Clysmata nutrientia)

Only water, ethanol, sodium chloride, glucose, lactose and some amino acids can be absorbed through the mucous membrane of the large intestine . In general, the absorption of the mentioned substances through the mucous membrane of the colon is weak, so even the minimum daily caloric needs cannot be met through nutrient enemas.

In the past, it was a common practice to make nutritional enemas from chicken egg yolk with the addition of liposoluble vitamins. That is a completely ineffective combination, considering that lipids, carbohydrates and proteins cannot be absorbed from the colon. An adequate nutritional enema can only supplement the patient's parenteral nutrition. If we still decide on a nutritional enema, at least 1 hour before its administration, the large intestine must be emptied with a laxative. The average volume of a nutritional enema is 150 ml. Magisterially, we can prescribe a nutritional enema like this:

Rp.
Ethanoli diluti 10.0
Glucosi 14.0
Natrii chloridi 1.0
Aquae purificatae ad 100.0
Misce fiat solutio.

Da ad vitrum.
S. Use the irrigator to apply the entire amount through anal opening.

b) Cleansing enemas (Clysmata evacuantia)

When laxatives taken orally are no longer effective, then an enema should be used. By introducing 500-1000 ml of water, the distal colon stretches, the feces softens, swells and the patient gets the urge to defecate. After the introduction of the liquid, the patient must hold the enema for at least 10 minutes in order for the feces to swell at least partially. Otherwise, only an enema will be expelled during defecation. To make the enema more effective, substances are often added to the water that irritate the mucous membrane of the colon. These are usually soapy water or glycerol (one tablespoon per liter of water).

In addition to real enemas for evacuation, there are also "micro-enemas", small amounts of a medicinal preparation with a gelatinous consistency that are packaged in special tubes. The tubes have a very elongated plastic neck that is introduced through the anal opening into the rectum, and then by squeezing the tube, the contents are "squeezed out" into the lumen of the rectum. In the form of a micro enema, a mixture of sodium lauryl sulfate and glycerol is applied, which has a laxative effect (the trademarked name is Relaxit^{R}, and it is registered as a medical device, not a drug). Relaxit^{R} can be obtained without a prescription, but in order to guide the patient correctly, we can still write a prescription as if it were a ready-made medicine:

Rp.
Relaxit micro enema 5 ml
Da scatulam originalem N ^{o} I (unam)
S. Carefully insert the neck of the tube through the anal opening, and then squeeze the tube .

c) Medicinal enemas (Clysmata medicata)

Medicinal enemas contain substances that act on the altered mucous membrane of the colon or are absorbed and act on distant parts of the body. As with nutritional enemas, the large intestine should be emptied before their administration. The volume of medicinal enemas is usually 50 to 100 ml. If the volume is below 20 ml, then we are talking about a micro-enema, which is not administered with an irrigator, but with a tube with a plastic attachment for introduction into the rectum.

An example of a medicinal enema is a finished medicine with the trade name Salofalk^{R} containing mesalazine, an effective tool for the treatment of ulcerative colitis:

Rp.
Salofalk clysmata 4.0 (60ml)
Da scatulam originalem N º And (unam)
S. In the evening , before going to bed , enter the contents of the bottle with the help of an irrigator through the anal opening .

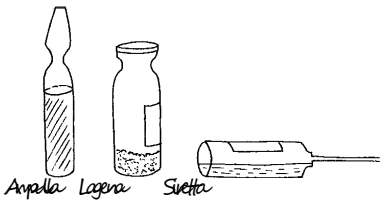
PARENTERAL PREPARATIONS
(Parenteralia)

Parenteral preparations are sterile medicinal preparations that are administered by injection, infusion or implantation. Apart from the main drug, they also contain excipients for isotonization, pH value adjustment, solubility improvement, conservation or stability increase of the main drug.

There are the following types of parenteral preparations: (1) injections, (2) intravenous infusions, and (3) implants .

INJECTIONS
(Injections)

Injections are sterile liquid medicinal preparations, maximum volume up to 100 ml, which are administered parenterally. By their nature, injections can be solutions, emulsions or suspensions. If the injection medium is water, it must be sterile (**Aqua pro injectione**). When the main drug is lipophilic, the base is usually neutralized olive oil (**Oleum olivae neutralisatum**) , which must also be sterilized .



Injections are packaged in ampoules (ampulla, ampullae), bottles (vitrum, vitri), vials (lagena, lagenae - the correct Latin name for the vial was laguncula,-ae, but was changed over time), sirettas (siretta, sirettae) or carpules (carpula, carpulae). **Ampoules** are glass vials without an opening; **Bottles and vials** are closed with rubber stoppers. **Syretes** are plastic vials with an injection needle at one end; the patient himself inserts the needle into the subcutaneous tissue or muscle, then squeezes the plastic reservoir and injects the contents. **Carpules** are glass cylinders with a piston at one end and a rubber stopper at the other. One end of the injection needle is introduced through the rubber stopper, and the entire carpule is placed in a special syringe that pushes the plunger. With one press of the syringe, a certain volume of the medicine that we previously set is injected through the needle. Carpules are the only parenteral forms of drugs for multiple use. Insulin preparations are often packed in carpules because they allow for simple, repeated administration of the medicine at home.

Carpula

All injections must meet the following conditions:

1) to be sterile
2) to be apyrogenic (not to cause an increase in temperature after injection)
3) that their pH is from 5 to 8
4) that there are no hypotensive substances in them

If the main drug is stable in solution, then injections are produced and dispensed in liquid form. If the drug is unstable in solution, then it is lyophilized (first it is frozen, and then the water is removed by creating a vacuum: in the end, a powder is obtained that is packed in hermetically sealed ampoules or vials) and then it is dissolved just before use by adding sterile distilled water. Injections are

administered using a syringe with a needle. The site of administration can be under the skin (subcutaneous injections, s.c.) , in the muscle (intramuscular injections, i.m.) , in the vein (intravenous injections, i.v.) , in the subarachnoid space (intrathecal injections), in the joint cavity (intra-articular injections), in the peritoneal cavity (intraperitoneal injections), in the pleural cavity (intrapleural injections), in the pericardial cavity (intrapericardial injections), in the chambers of the heart (intracardial injection) and elsewhere. When it comes to intravenous injection, you should know that the medicine (regardless of which one is in question) must not be injected for less than 2-3 minutes! When it is said that a drug is administered as a bolus-intravenous injection, it is meant that the entire dose of the drug is administered at once, without interruption; but that doesn't mean it can be given in less than 2-3 minutes!

Injections are mostly ready-made medicines, so we prescribe them as such. However, sometimes among the ready-made medicines there is no one that we want to apply to the patient. Then we can prescribe the desired medicine in the form of a magisterial injection. Noradrenaline is a powerful vasoconstrictor that can be used as an adjunctive medicine in the treatment of anaphylactic shock. Since it is not available in ready-made medicines, it can be prescribed by prescription as follows :

Rp.
Noradrenalini hydrogen tartratis 0.0025
Aquae pro injectione 20.0
Misce fiat solutio.
Da ad vitrum collo amplo, sterilisa.
Signa suo nomine. Ad manum medici.

* In 2 ml of solution is 0.25 mg of noradrenaline bitartrate , which is the mean single dose . Da ad vitrum collo amplo, sterilisa = Dispense in a bottle with a wide neck, sterilize (Hereby, we order the pharmacist to sterilize the medicine and dispense it in a bottle with a wide neck, so that the doctor could repeatedly take the medium single dose from the bottle.). Ad manum medici = In the hands of the doctor (the pharmacist should explain to the patient that he should take the ampoules to the doctor so that he can administer them) .

INFUSION SOLUTIONS
(Infundibilia)

Infusion solutions are liquid and sterile medicinal preparations that are administered parenterally, always in a volume greater than 100 ml. They are most often administered intravenously, but subcutaneous, intrapleural, intraperitoneal and other applications are also possible. Each infusion solution must be apyrogenic, without hypotensive substances and sterile. Usually infusion solutions are isotonic (same osmotic pressure as blood plasma = 300 mOsmol/l), but they can be hyper- or hypo-tonic. Solutions for parenteral nutrition, solutions for the treatment of cerebral edema, and some solutions for hemodialysis are hypertonic. Hypotonic solutions can be used to treat hypernatremic dehydration.

Infusion solutions are dispensed in bottles (which can be glass or plastic) or in plastic bags. Bottles always have a rubber stopper through which the needle of the infusion system is inserted. The infusion system consists of a plastic (PVC) tube with an inserted reservoir that allows the infusion to be dosed in drops and to remove any air bubbles. The infusion system connects a bottle of infusion solution to a needle in the patient's vein. In order to administer the infusion solution, it is necessary to raise the bottle above the level of the patient's heart; thus, under the influence of the earth's gravity, the liquid will descend into the vein. If the patient is in conditions of reduced atmospheric pressure (for example in a helicopter or plane), it is necessary to apply additional pressure to the bottle (or inject air above the liquid into it) so that the liquid goes into the vein. This can be done by wrapping the cuff of the pressure apparatus around the bottle and inflating it.

The speed of the infusion solution is measured by the drops we count in the drip chamber (droppers) during one minute. The diameter of the tube in the dropper depends on how big the drops will be, i.e., how many drops are in a milliliter. In intravenous sets for adults, there are droppers with 10, 15 or 20 drops per milliliter, while in intravenous sets for children, droppers give 60 drops per milliliter. The manufacturer is obliged to indicate on the packaging of the intravenous set (system) how many drops per milliliter can be expected in its drip chamber. So, if we give the infusion at a rate of 40 drops per minute, and the dropper is such that 10 drops make 1 ml, it means that we apply 4 ml of solution every minute.

Solutions for infusions are usually ready-made medicines. One of the ready-made preparations is an isotonic glucose solution:

Rp.
Glucosi infundibilis 5% 500.0
Da occlusionem praeformatam N º I (unam)
S. Ad manum medici.

PHARMACEUTICAL PREPARATIONS UNDER PRESSURE (AEROSOLS)

(Preparationes pharmaceuticae in vasis cum pressu)

Aerosols are preparations packed in special packaging, under gas pressure. When the valve is opened, solid particles or drops of liquid in the gas are dispersed, creating an aerosol, which escapes under pressure into the environment.

The gas contained in the pressurized package is called the propellant. The propellant can be propane, butane, carbon dioxide, nitrogen or nitrous oxide.

INHALATION

(Inhalationes seu Inhalanda)

Inhalations are medicinal preparations that are introduced into the respiratory tract in the form of steam, small droplets or powder. They are divided into: (1) liquid preparations intended for use in steam, (2) liquid preparations for nebulization (spraying), (3) liquid preparations under pressure, with a dispenser and (4) powders for inhalation.

1. Liquid preparations intended for application in the form of steam. If the main medicine is easily volatile, then it is enough to bring it to the nostrils, and when breathing, the vapor of the medicine will enter the respiratory tract. Usually, however, these preparations are administered using an inhalation chamber: the drug is poured into the chamber, where it evaporates, and the patient inhales the air from the chamber along with the vapor of the drug.

2. Liquid preparations for nebulization (spraying) . The medicinal preparation in the form of a solution, suspension or emulsion is mixed with air using a special device (nebulizer) and converted into an aerosol, which the patient then inhales. Nebulizers work using gases under high pressure or using ultrasonic vibrations. When the drug is administered using a nebulizer, the patient does not need to know any special breathing technique; it is enough just to breathe into the mask that is connected to the device. That is why nebulizers are used in small children or mentally retarded adults, i.e., in patients who cannot be trained in the appropriate inhalation technique.

3. Liquid preparations for inhalation under pressure, and with a dispenser. These are pharmaceutical preparations under pressure, with a suitable dosing valve. With one press of the valve, they release an exact dose of aerosol, which the patient needs to inhale. At the same time, the patient should have a good inhalation technique: take the valve with his lips, press it and inhale at the same time, then hold the air in inspiration for 10 seconds, and finally, exhale . Only with this technique will the drug aerosol reach the smallest airways, where it should exert its effect. Therefore, such preparations can only be used by persons who can be trained in adequate inhalation technique. The effectiveness of the preparation depends on the quality of the nebulizer: the smaller the droplets, the further they will reach the respiratory tract. Only droplets with a diameter of less than 5 microns reach the smallest bronchioles.

4. Powders for inhalation . These preparations contain a powder, which is administered using a special inhaler. The inhaler for dry powder has a valve, the activation of which results in the dispersal of a precisely determined dose of medicine in the air. The patient inhales that dose, in the same way and with the same technique, as with liquid preparations under pressure, with a dispenser.

All inhalations that are in use today are ready-made medicines. Most often, these are preparations that are used to treat asthma and chronic obstructive pulmonary disease. Such a drug is beclomethasone, a topical inhaled corticosteroid:

Rp.

Becloforte ® CFC-Free Inhaler inhalatio 200 doses (250 μg/dose)

Da scatulam originalem N ºI (unam)

S. Three times a day inhale once after pressing the pump.

DROPS
(Guttae)

Drops are liquid medicinal preparations that are dosed and applied in drops. Drops are divided into drops for external use and drops for internal use. In order to know how much of the main drug is in one drop, we need to know how many drops are contained in one milliliter of some liquid at room temperature. That number varies from preparation to preparation, but there are still some rules:

- 1 ml of aqueous solution contains about 20 drops
- 1 ml of oil solution contains about 40 drops
- 1 ml of alcoholic solution contains 50-60 drops.

So, for example, if an aqueous solution has 20 mg of the main drug per milliliter, then in one drop of such a solution there will be about 1 mg of medicine.

Drops for external use

Drops for external use are instilled into the nose, conjunctival sac or external ear canal. They are packaged and dispensed in a bottle with a dropper (vitrum cum pipette) or in a bottle with a dropper on the lid (vitrum guttatorium). Eye drops and nose drops must be dispensed in a bottle with a dropper. The volume of the bottle is always up to 10 ml.

1. Eye drops (oculoguttae)

Eye drops must always be sterile and isotonic. It should be explained to the patient that only one drop can fit into the conjunctival sac, and that if two or more drops are instilled, the excess will flow into the nasal passages through the nasolacrimal duct. After instilling the drops, the patient should use a piece of sterile cotton to press the inner corner of the eye to slow down the swelling of the medicine from the conjunctiva. Once the bottle of eye drops is opened, it can be used for a maximum of 7 days. After that period, the drops are no longer sterile. In addition to the main drug, eye drops usually contain auxiliary substances: for adjusting osmolarity or viscosity, for adjusting pH, for

stabilizing the preparation and for preserving the preparation (preventing the colonization of the preparation with bacteria).

Eye lotions **(collyria)** are liquid medicinal preparations that are used to wash the eye. They are made in the same way as drops, but are used in a much larger volume.

Tropicamide is a blocker of muscarinic receptors, which after instillation in the eye leads to mydriasis and paralysis of accommodation. Its effect lasts only 1-2 hours, so it is often used to prepare the eye for fundus examination. It can be prescribed as a ready-made medicine:

Rp.
Unitropic 1% oculoguttae 10.0 (1%)
Da scatulam originalem N ^{o} I (unam)
S. Externally, instill one drop in both eyes. After 10 minutes repeat the same dose.

2. Nose drops (rhinoguttae)

Nasal drops are instilled into the nostrils, preferably while the patient is lying down. Usually 2-4 drops are instilled in one nostril. First, the secretion should be well drained from the nasal passages by blowing the nose. The patient should be trained on how to properly administer the nasal drops. In a sitting position, the patient tilts his head back, and one drop is instilled into his nostril; he then immediately bends his body forward on his knees, stays in that position for a few seconds, and then straightens up.

The vasoconstrictor naphazoline is instilled into the nose to decongest the nasal mucosa and enable nasal breathing. It can be prescribed as a ready-made preparation:

Rp.
Nafazolin rhinoguttae 10 ml (0.1%)
Da lagenam originalem N ^{o} I (unam)
S. Externally, instill 2-4 drops in each eye three times a day nostril.

3. Ear drops (otoguttae)

Otoguttae are instilled into the external ear canal. At one application, 5-10 drops are instilled. Before application, the drops must be warmed up to body temperature in order not to cause an unpleasant feeling of dizziness due to the stimulation of the semicircular canals. In addition to the main drug, the ear drops contain a vehicle that must not

irritate the eardrum (e.g., water, fatty oils or glycols). Antibiotics and anti-inflammatory drugs are usually instilled into the external ear canals. The combination of thyrothricin and prednisolone is very useful for the treatment of diffuse bacterial infections inflammation of the external ear canal ; it is found in the finished preparation Otol H:

Rp.
Otoll H otoguttae 10 ml
Da lagenam originalem N ^{o} I (unam)
S. Externally, instill 5 drops in the affected ear 4 times a day.
Otol H = tetracaine 1% + prednisolone 0.1 % + thyrothricin 0.01 % .

Drops for internal use

Drops for internal use are taken orally. The patient instills a certain number of drops (containing the mean individual dose) on sugar cube or into a teaspoon with a little water, and then swallow it. The average single dose should be contained in at least 5 and at most 20 drops; if it is in less than 5 drops, the patient can easily make a mistake and overdose the medicine, and if it is in more than 20 drops (which already makes 1 ml) , the sugar cube cannot receive all the drops, but melts.

Since errors in the dosage of drops are very common, it is best not to prescribe drugs with a very strong effect in the form of drops. Drops for internal use are issued in a bottle with a dropper on the lid (vitrum guttatorium) in a volume of 10-20 ml. In order for the doctor to be able to dose the drug in the form of drops, he needs to know two things: the concentration of the drug and the number of drops in one milliliter of the preparation. If we want, for example, to prescribe the opiate antitussive codeine to the patient in the form of drops, so that 5 drops contain an average single dose (30 mg), we write a master prescription :

Rp.
Codeini phosphatis 1,2
Aquae purificatae ad 10.0
Misce fiat solutio.
Da ad vitrum guttatorium.
S. Take 5 drops on a sugar cube three times a day .

* If we want 5 drops to contain 30 mg, this means that 20 drops (1 ml) should contain 4 x 30 mg = 120 mg. 10 ml of solution = 10 times the amount of codeine = 1.2 g.

EYE PREPARATIONS
(Ocularia)

Eye preparations are sterile, liquid or solid preparations intended for application to the conjunctiva. The types of eye preparations are: (1) eye drops, (2) eye lotions, (3) eye drops, and (4) inserts. Eye drops and lotions have already been discussed.

Eye drops are sterile ointments, creams, or gels that are applied to the conjunctiva. They are packed in small (up to 5 g), sterile and flexible tubes with nozzle. From them, the preparation is pressed directly onto the conjunctiva of the displaced lower eyelid.

Ophthalmic inserts are sterile, solid or soft preparations, which consist of a reservoir of the active substance embedded in a matrix or coated with a membrane, so that the substance is gradually released. They are placed in the conjunctival sac.

PREPARATIONS FOR THE NOSE
(Nasalia)

Nasal preparations are liquid, liquid or solid preparations intended for use in the nasal cavity, for local or systemic action. In addition to the active substance, they contain preservatives, which prevent bacterial colonization of the preparation.

The types of nasal preparations are: (1) nasal drops, (2) nasal aerosol (spray), (3) nasal powder, (4) nasal rinses, (5) soft preparations, and (6) sticks for the nose. Nasal drops, aerosols and sticks have already been discussed.

Nasal powder is a preparation intended for snorting, using a suitable applicator.

Soft preparations are ointments, creams or gels, which are applied into the nasal cavities using specially designed tubes.

Preparations for rinsing the nose are aqueous, isotonic solutions intended for cleaning the nasal passages .

EAR PREPARATIONS
(Auricularia)

Ear preparations are liquid, soft or solid medicinal preparations, which are applied in the external ear canal. In principle, they must be sterile. Types of ear preparations are: (1) ear drops and sprays, (2) ear powders, (3) soft preparations, (4) external ear canal washes, and (5) ear tampons. Ear drops, tampons and sprays have already been discussed.

Ear powders are blown into the external ear canal using a special applicator.

Soft preparations are ointments, creams or gels, which are applied to the external ear canal with special tubes.

Preparations for rinsing the external ear canal are aqueous solutions with a physiological pH, which are used to rinse the external ear canal with the help of Jeanette's syringe.

TEAS
(Species)

Teas are mixtures of parts of herbal drugs that are not administered as such, but extracts are made from them. The obtained extracts can be used both orally and externally. Teas are prescribed in the amount of about 25-50 g. They are issued in a box (scatula) or bag (sacculum). When the tea is packed in a box, the active principle remains unchanged for longer. Teas whose active principles have a mild effect can be bought in a pharmacy without a prescription. The patient at home, based on the doctor's instructions, is making the tea extract. Three basic types of extracts can be made :

a) macerate (macerate)

The tea is poured with water at room temperature and left to stand for 30 minutes. After that time, the liquid is strained. The strained liquid is immediately ready for use. Macerates are made from drugs whose active principles are thermolabile and from drugs that have mucilaginous substances. In our region, a macerate of marshmallow

root (picture 6) is often prepared, which contains mucilaginous substances:

Rp.
Althaeae radicis * 25.0
Da ad sacculum.
S. Pour one teaspoonful of tea with two large spoons of cold water and let it stand for 30 minutes. Then strain and drink one sip every 15 minutes.

* Marshmallow root is prescribed magisterially .

Picture 6. Marshmallow

b) infusion (infusum)

The tea is first soaked in water at room temperature and left to stand for 5 minutes. It is then poured with boiling water and (with occasional stirring) left to stand for 30 minutes. After 30 minutes, the liquid is strained and can be used. Infusions are made from drugs of delicate structure (flower, leaf) and from drugs that contain easily volatile and thermolabile active principles. The infusion is made from the chamomile flower (picture 7) which contains the essential oil azulene:

Rp.
Chamomillae floris 25,0
Da ad sacculum.
S. Pour one teaspoonful of tea with two large ones spoons of boiling water and let it stand for 30 minutes. After that, strain and drink.

* Chamomile tea is prescribed magisterially.

Figure 7. Chamomilla

c) decoction

The tea is poured with cold water and then steamed until it reaches 90 ° C . It is kept at that temperature for 30 minutes, and then strained. Once the strained liquid has cooled, it can be used. Decoctions are made from drugs with a hard structure (root, rhizome) that contain thermostable active principles. In our country, there is a lot of bitter gourd, which contains saponins in the rhizome and roots. A decoction is made from them as an excellent expectorant.

Rp.
Primulae radicis * 50,0
Da ad scatulum.
S. Pour one large spoonful of tea with a glass of cold water water and cook for half an hour. Then strain, cool and to drink.

* Primula tea is prescribed magisterially .

When the teas contain active principles with a very strong effect, then it is best to prescribe the patient with a ready-made extract (macerate, infusion or decoction) that the pharmacist will prepare in the pharmacy. This avoids the possibility of the patient making a mistake when making the extract and overdosing the medicine. The root of ipecac, a South American plant, contains the alkaloid emetine, which in small doses is a good expectorant and emetic, and in larger doses is highly cardiotoxic. That is why it can only be prescribed as a ready-made infusion.

Rp.
Ipecacuanhae radicis 0.7
Fiat lege artis infusum cum
aqua purificata ad colaturam 180.0
Syrups simplicis ad 210.0

Misce fiat solutio.
Da ad vitrum nigrum.
S. Drink one large spoonful of the medicine three times a day .

* Fiat lege artis infusum cum aqua purificata ad colaturam 180 = Make an infusion according to the rules with distilled water up to a total amount of 180 ml.

The same prescription can be written in the abbreviated form that is common today:

Rp.
Infusi Ipecacuanhae radicis 0.7 : 180.0
Syrups simplicis ad 210.0
MDS. Drink one large spoonful three times a day.

MEDICINAL OINTMENTS
(Unguenta)

Medicinal ointments are medicinal preparations for external use. They can be applied to the skin, mucous membranes or superficial wounds (burns, scratches, etc.). The main drug is mixed with a base (dissolved, emulsified or suspended) which is hydrophobic and feels like lard under the fingers. Ointments are most often applied for the local effect of the main drug. However, sometimes the main drug from the fat is absorbed through the skin and exerts its effects elsewhere in the body. The condition for this to happen is that the main drug is sufficiently soluble in lipids. Nitroglycerol, a drug from the nitrate group that is used to treat angina pectoris attacks, can be applied as an ointment because it is well absorbed through the skin.

Ointments can be completely *hydrophobic* (do not accept water at all), then have *the ability to emulsify water* (because they contain emulsifiers of the " water in oil " type , such as lanolin alcohols, fatty alcohols, monoglycerides), or be *hydrophilic* (their substrates mixed with water: polyethylene glycols).

The ideal base for making ointment is indifferent, does not irritate the skin, does not affect the main drug and does not deteriorate in light and air. There is no ideal base, but a large number of fatty substances meet at least some of the above conditions.

1. Lard (adeps suilus) - adheres well to the skin and allows good contact of the main drug with the skin. A bad feature is that it spoils quickly in the air (due to the oxidation of unsaturated fatty acids).

2. Yellow wax (cera flava) - obtained from bee's comb. It cannot be used as a foundation on its own because it is too solid at body temperature. That is why it is mixed with various oils until it gets the desired consistency. It is more stable than lard

3. White wax (cera alba) - it is obtained by bleaching yellow wax .

4. Cetaceum (spermacet) - is fat from the skull and spinal vertebrae of a whale. It fits well on the skin that absorbs it. Like lard, it spoils easily in air and light.

5. Lanoline (cera lanae, adeps lanae, lanolinum) - the fat found in sheep's wool and from which it is obtained by washing. It can contain more or less water (lanolinum anhydricum, adeps lanae hydrosus). It is one of the best foundations .

6. Lanalcol (lanalcolum) - a mixture of sterols and aliphatic alcohols. It receives water poorly.

7. Yellow vaseline (vaselinum flavum) - is a mixture of aliphatic, saturated hydrocarbons that is obtained as a residue after extracting gasoline and other derivatives from oil. It is not absorbed into the skin, so after application, an oily layer remains on the surface of the skin for a long time. It is extremely stable .

8. White vaseline (vaselinum album) - it is obtained by bleaching yellow vaseline .

9. Polyethylene glycols are polymers in which the repeating element is ether with the formula CH2-O-CH2. Depending on the polymerization number (that is, on the size of the molecule), polyethylene glycols are at room temperature in a liquid (low polymerization number) or solid state (high polymerization number). If the molecular weight is below 100,000 Daltons, the name polyethylene glycols is used, and if the molecular weight is higher, such polymers are called polyethylene oxides. Their good feature is that they are soluble in both water and organic solvents (they are amphiphilic). They are also called macrogols (macrogolum).

10. Liquid paraffin (paraffinum liquidum) is a mixture of liquid hydrocarbons obtained during the distillation of oil.

11. Cetostearol (cetostearolum) - is a mixture of equal parts of cetanol (higher alcohol) and stearyl alcohol.

Since none of the mentioned substrates fulfills all the conditions of an ideal substrate, in practice complex bases for ointments, obtained by mixing basic substrates, are often used.

Here are examples of complex bases:

a) unguentum emolliens (cooling ointment) - contains a lot of water, which evaporates after application and thus cools the skin. It can be used for all skin oils, especially in cosmetics. The composition is as follows :

Cetaceum	12.5 g
Cera alba	12 g
Parafinum liquidum	56 g
Sodium tetraboras	0.5 g
Aqua purificata	19 g

b) base for eye ointments (excipiens ad oculenta)

Cera lanae	10 g
Vaselinum album	80 g
Paraffinum liquidum	10 g

c) Universal base for all ointments (excipiens ad unguenta):

Cera alba	5 g
Cetostearolum	5 g
Cera lanae	5 g
Vaselinum album	85 g

Medicinal ointments are usually prescribed undivided, in the total amount. Then they are dispensed in plastic boxes (Da ad scatulam). Only those ointments that are applied for a systemic effect are prescribed in divided doses: each individual dose is dispensed in a small pouch made of wax paper (charta cerata). The amount of medicinal ointment prescribed to the patient depends on the surface of the skin affected by the pathological change. If that area is equal to the area of the face, 30 g of ointment should be prescribed; if the whole body is affected, the patient should receive about 200 g of ointment. As an example of an ointment for external use, we will prescribe an ointment with boric acid:

Rp.	
Acidi borici	3.0

Vaselini Albi ad 100.0
Misce fiat unguentum.
Da ad scatulamm.
S. Externally, smear the affected areas three times a day .

* Ointment with boric acid has 3 g of boric acid (H_3BO_4) and 97 g of white Vaseline .

Eye ointments (oculenta) are a special type of medicinal ointments. They are issued in quantities of 5 to 10 g. They must always be sterile! When manufactured as ready-made drugs, they are usually packaged in long-necked tubes from which they are extruded directly onto the conjunctiva of the lower eyelid. If they are made in a pharmacy, then they are issued in a plastic box with a glass stick with which they are applied to the conjunctiva (bacillum vitreum). The indirect parasympathomimetic pilocarpine can be prescribed topically in the form of an eye ointment:

Rp.
Pilocarpini hydrochloridi 0.2
Excipientiss ad oculenta ad 10.0
Misce fiat oculentum. Sterilisa.
Da ad scatulam cum bacillo vitreo.
S. Externally, once a day put a little ointment (size grains of wheat) in the affected eye .

PASTE
(Pasta)

Pastes are fine medicinal preparations for external use where large amount of a powder is evenly suspended in an oily base. When a bit of the paste is rubbed between the fingers, a grainy consistency is felt.

The ratio of powder to oily base is usually 1:1. Pastes usually contain the following powders: zinc oxide (zinci oxydum), talc (talcum), wheat starch (amylum tritici), rice starch (amylum oryzae) or white clay (bolus alba, kaolinum).

The pastes are intended for the treatment of pathological changes on the skin that are moisturizing because they absorb secretions well. In addition, since the pastes also mechanically protect the skin on which they are applied, they are widely used in surgery to prevent skin

erosion around the opening of intestinal stomas (jejunostomy, ileostomy, colostomy, etc.). The patient is usually given 10 to 50 g of paste per day, packed in a plastic box (scatula) .

One of the most commonly used pastes is Lassar's paste, which is used as an astringent and mild keratolytic. The composition of this paste is as follows: acidum salicylicum 2 g, zinci oxydum 24 g, talcum 24 g and vaselinum flavum 50 g, according to which it can be prescribed as a magisterial medicinal preparation:

Rp.
Zinci oxydi 24.0
Acidi salicylici 2.0
Talci 24.0
Vaselini flavi 50.0
Misce fiat unguentum.
Da ad scatulam.
S. Externally, apply to the affected areas twice a day .

MEDICINAL GELS
(Gelatinae medicinales)

Medicinal gels (gels) are medicinal preparations for external use in which the main drug is dissolved, suspended or emulsified in a base that is gelled with suitable gelling agents. In the past, the substrate was made of animal gelatin, glycerol and water. Animal gelatin is a purified protein obtained by partial hydrolysis of animal collagen. At room temperature, the gels have a sticky consistency, and when they are applied to the skin, they melt.

Today there are **hydrophobic** gels (the base is made of liquid paraffin gelled with polyethylene glycol, or fatty oils gelled with colloidal silicon oxide, aluminum or zinc soaps) and **hydrophilic** gels (the base is made of water, glycerol or propylene glycol gelled with tragacanth, starch, derivatives of cellulose, etc.).

Gels are used for the application of medicines on hairy parts of the body because they adhere well, do not grease the hair and are easily removed by washing. Only freshly made gels are issued to patients because they spoil quickly. They are packed in plastic boxes. A topical

corticosteroid (fluocinolone acetonide) may be prescribed to treat psoriatic changes that are often localized to hairy areas of the skin:

Rp.
Sinoderm gelatina medicinalis 30.0
Da tubam originalem N ^{o} I (unam)
S. Externally, apply to the affected areas twice a day .

CREAMS
(Cremores)

Creams are medicinal preparations for external use in which the base is made of fatty substances emulsified in water. That's why creams are much less " greasy " than medicated ointments, adhere well to the skin and add water to dry skin. Like gels, they can be applied to hairy areas of the skin. If it is a question of skin lesions that moisturize, creams are much more suitable than medicated ointments, to which the secretion prevents contact with the epithelium. Creams are sold in plastic boxes, and ready-made cream preparations are usually packed in tubes.

Depending on the ratio of fatty substances and water, creams can be **hydrophobic** (dominated by fatty substances, contain emulsifiers of the "water in oil" type, e.g., anhydrous lanolin, monoglycerides, sorbitan esters) or **hydrophilic** (dominated by water, contain emulsifiers of the "oil in water" type", e.g., soaps, sulfates of fatty alcohols, polysorbates).

The basic cream to which various medicinal substances can be added is a moisturizing cream (Aqueous Cream according to the British Pharmacopoeia). It can be prescribed magisterially:

Rp.

Cetostearoli		9,0
Natrii lauryl sulphacetatis		1,0
Paraffini solidi		15,0
Paraffini liquidi		7,0
Phenoxyethanoli		1,0
Aquae purificatae	ad	100,0

Misce fiat cremor.
Da ad scatulam.
S. Externally , spread on the dry and chapped skin of the hands.

Moisturizing cream can be used successfully for dry skin care; its quality doesn't differ a bit from the quality of expensive cosmetic preparations .

EXTRACTS
(Extracta)

Extracts are liquid, solid or granular medicinal preparations obtained by extraction from drugs using solvents. The solvent can be water, alcohol, ether or something else. The obtained extract can be used in a liquid state (extractum fluidum) , or we can evaporate the solvent so that the extracted substance remains in the form of a powder (extractum siccum). Examples of aqueous extracts are macerates, infusions and decoctions.

LOTIONS
(Lotiones)

Lotions are liquid medicinal preparations for external use only in the form of solutions, suspensions or emulsions. They are issued in bottles (vitrum). In the *signatura* of every prescription that prescribes the lotion, the word "External" must be written. If the lotion is a suspension, it should also be written "Shake before use!" . Lotions can be used on both bare and hairy parts of the skin. Antimycotic bifonazole, which is used to treat dermatomycosis, can be prescribed in the form of a lotion:

Rp.
Canespor lotio 15.0 (1%)
Da tubam originalem N º I (unam)
S. Externally, rub the lotion into the skin once a day affected by a fungal process.

BALMS
(Linimenta)

Balms are liquid or solid medicinal preparations that are used to rub into undamaged skin. According to their character, balms can be

solutions, suspensions or emulsions. Medicines are usually prescribed in the form of balms that have an irritating effect and cause mild inflammation of the skin and subcutaneous tissue at the site of application (rubefaciens = those that cause reddening of the skin). It can be used for chronic rheumatism (preparations of camphor, ammonia, capsaicin from paprika, etc.) and poor blood circulation in the skin. In addition to these drugs, agents that have a scabicidal effect can be prescribed as balms. Benzyl benzoate balm (25%) can be prescribed as magisterial preparation:

Rp.
Benzylis benzoatis 25.0
Cerae emulsificantis 2.0
Aquae purificatae ad 100.0
Misce fiat linimentum.
Da ad vitrum.
S. Externally, in the evening before going to bed, apply to the whole body except head. After five days, apply the medicine once more.

TINCTURES
(Tinctureae)

Tinctures are water-alcohol extracts of drugs or water-alcohol solutions of previously obtained drug extracts. Tinctures are always colored (most often with the extracted substance itself), so they got their name from that feature (lat. tingo, -ere = to coat with color).

Tinctures are intended for oral use. They are dosed in drops (if the main drug is very strong) or with a small spoon. They are issued in a bottle (vitrum); the amount dispensed depends on the concentration of the active substance in the tincture. As an officinal preparation (described in previous editions of the pharmacopoeia), nightshade tincture (containing atropine and scopolamine; Figure 8) could be prescribed, with a total concentration of all alkaloids up to 0.03%:

Rp.
Belladonnae tincturae 10.0
Da ad vitrum nigrum.

S. Take 25 drops of tincture with a little water three times a day

.

Atropa belladonna

Picture 8. Night shade.

WOUND DRESSING MATERIAL

(Telamenta)

Dressing material can also be prescribed by prescription. One part of the dressing material was listed in earlier pharmacopoeias (so it is officinal), and the rest can be found on the market as a ready-made (protected) dressing material.

Bandage material includes: cotton wool, gauze, bandages, plasters and fabrics.

a) Cotton wool (Lana)

Cotton wool is a white, fibrous, soft mass without a constant shape, smell and taste. Cotton wool is obtained from cotton or wood pulp. It is used to clean the skin, to cover the extremities before plastering and to bandage burns (above the layer of gauze that directly rests on the skin). In earlier editions of the Pharmacopoeia, the following types of cotton wool were listed:

- Lana cellulosi ligni regenerata (ordinary wool made of cellulose fibers)
- Lana cellulosi ligni regenerata sterilis (sterile wool)
- Lana cellulosi ligni regenerata delustrata (wool with a dimmed shine using titanium dioxide)

- Lana cellulosi ligni regenerata delustrata sterilis (sterile cotton wool with muted shine)
- Lana gossypii cardata cruda (raw cotton wool)
- Lana gossypii depurata (purified cotton wool)
- Lana gossypii depurata mixta (mixed wool from cotton and cellulose fibers)
- Lana gossypii depurata mixta sterilis (sterile mixed wool)
- Lana gossypii depurata pro oculis (purified cotton wool for the eyes)
- Lana gossypii depurata sterilis (sterile purified cotton wool)
- Lana gossypii depurata sterilis pro oculis (sterile purified eye cotton)

The doctor will prescribe the type of cotton wool that best suits the specific patient. If we want to prescribe 300 g of ordinary cotton wool, we can do it as follows:

Rp.
Lanae gossypii depuratae 300.0
DS. Cotton wool.

b) gauze (Tela)

Gauze is a thin, white fabric. It is always 80 cm wide, while the length can be variable (usually 25 cm, 50 cm, 1 m or more). Gauze can be woven from cotton thread or from thread made from cellulose fibers. The pharmacopoeia lists these gauzes:

- Tela cellulosi (gauze from cellulose fibers)
- Tela cellulosi sterilis (sterile gauze made of cellulose fibers)
- Tela gossipii (cotton gauze)
- Tela gossipii sterilis (sterile cotton gauze)

When we prescribe, for example, 3 sterile packages of cellulose gauze of 50 cm each in length, the prescription should look like this :

Rp.
Telae cellulosi sterilis 80 cm x 0.5 m
Da No III (tres)
S. Sterile gauze .

c) bandage (Fascia)

The bandage is a thin fabric in the form of a strip, between 4 cm and 20 cm wide and 5 m long. If the bandage is thinly woven, it is called mul - bandage, and if it is densely woven, it is called calico - bandage. According to the fourth edition of our pharmacopoeia, the following dressings are officinal:

- Fascia calicutensis cruda (raw calico bandage , gray color)
- Fascia calicutensis depurata (calico – bandage made of bleached fabric, white color)
- Fascia calicutensis depurata sterilis (sterile bleached calico bandage)
- Fascia cellulosi (mul - bandage made of cellulose fibers)
- Fascia cellulosi sterilis (sterile mul - bandage made of cellulose fiber)
- Fascia gossypii (cotton bandage)
- Fascia gossypii sterilis (sterile cotton mul - bandage)
- Fascia gossypii sterilis ad tamponationem (sterile cotton wool - bandage for tamponade: this bandage has a woven edge, so that when tamponing a body cavity, the ends of the bandage do not fall off and do not enter the tissue).

If the doctor wants to prescribe 4 mul-bandages made of cotton 8 cm wide, will do like this :

Rp.
Fasciae gossypii 8 cm x 5 m
Da N º IV (quattuor)
S. Bandage.

d) Patch (Colleplastrum)

A patch is an adhesive fabric in the form of a strip, of different widths and lengths. It is used to fix bandages. According to the latest edition of our Pharmacopoeia, there are no more officinal patches. Only ready-made patches produced by pharmaceutical companies can be prescribed.

d) Fabric (Linteum)

Linteum is a fabric thicker than gauze (calico - weaving) without fixed dimensions. It can be used to make triangular scarves, mitella (for carrying an injured arm), and the like. The pharmacopoeia contains:

- Linteum calicutense crudum (raw calico fabric , gray color)

- Linteum calicutense depuratum (bleached calico fabric)
- Linteum calicutense depuratum sterilis (sterile bleached calico fabric)

Three meters of bleached calico fabric, 1.4 m wide, can be prescribed as follows :

Rp.
Lintei calicutensis depurati 1.4 m x 3 m
D.S. Calico fabric.

TRANSDERMAL PATCHES
(Emplastra transcutanea)

Transdermal patches have a medicinal substance applied to them, which gradually penetrates the skin after sticking the patch and reaches the systemic circulation. The outer layer of the patch is impermeable to the medicinal substance and water, and it prevents the loss of the active substance. The inner layer of the patch, which comes into contact with the skin, can be in the form of a special matrix, in which the medicinal substance is, or it can have a reservoir of semi-solid consistency, with the medicinal substance, which has **a membrane** on the inside (toward the skin) which controls the release of the preparation.

In this way, lipophilic drugs are applied, which should gradually reach the systemic circulation. An example of such a drug is the female sex hormone estradiol, which is applied in the form of a transdermal patch to women in menopause .

VACCINES AND SERUMS
(Vaccina et antitoxina)

Serums are biological medicinal preparations that are extracted from the blood of animals or humans after their exposure to antigens. Serums contain significant titers of antibodies against microorganisms or against human antigens foreign to the patient to whom they are administered.

Vaccines are sterile medicinal preparations made from weakened (attenuated) microorganisms, from dead microorganisms,

their parts, or from modified products of microorganisms and which are used to cause a human immune response to these microorganisms.

Vaccines and serums are stored in a refrigerator at a temperature of 2 to 10 ^{o}C , and they must not be frozen because then they lose their activity. Vaccines and serums are produced today only as ready-made preparations. Most often, these preparations are liquid, in the form of suspensions, but they can also be lyophilized, so they are dissolved immediately before use. Anti-tetanus serum and tetanus vaccine are the two preparations from this group that are most often prescribed today. The tetanus vaccine can be prescribed as a ready-made medicine:

Rp.
Tetavaksal-T amp. 0.5 ml (40 IU)
Da talem ampullam N ^{o} I (unam)
S. Ad manum medici.

Today, mainly anti-tetanus serum of human origin is used. The mean single dose of antitetanus human serum is 250 IU. We will prescribe a ready-made preparation of human serum :

Rp.
Atebulin ampoule 250 IJ
Da talem ampullam N ^{o} I (unam)
S. Ad manum medici.

PRESCRIPTIONS - EXAMPLES

Note : all stated doses refer to a 70 kg person unless otherwise indicated.

ANTIPSYCHOTICS

Antipsychotics (neuroleptics) are drugs intended for the treatment of psychoses.

1. Chlorpromazine can be used orally and parenterally. Due to pronounced side effects, it is used less frequently than other neuroleptics for the chronic treatment of schizophrenia (oral) . Around that, earlier it was used to calm the manifestations of delirium (im. injection) , but today the preference in that indication is given to haloperidol .

Rp.
Chlorpromazine tablettae 0.025
Da scatulam originalem N ^{o} I (unam)
S. In the morning , at noon and in the evening take one tablet.

2. Haloperidol is one of the most powerful neuroleptics that blocks D_2 dopamine receptors. It is used in the chronic therapy of schizophrenia , but also to calm delirious states, e.g., in old people after surgical interventions. A very pronounced extrapyramidal syndrome occurs as an unwanted effect.

Rp.
Haloperidol tablettae 0.002
Da scatulam originalem N ^{o} I (unam)
S. Take one tablet twice a day .

3. Clozapine is an atypical neuroleptic used primarily in schizophrenia with the so-called "negative symptoms". It is the most effective neuroleptic, but it can cause agranulocytosis. Therefore, periodic control of the number of leukocytes is necessary.

Rp.
Leponex tablettae 0.025

Da scatulam originalem N º I (unam)
S. One tablet twice a day.

ANTIDEPRESSANTS

Antidepressants are used to treat endogenous depression, the depressive phase of bipolar psychosis, obsessive-compulsive neuroses, panic disorder, bedwetting in children and chronic pain without a morphological basis.

4. Paroxetine selectively inhibits serotonin reuptake in nerve endings. It is very effective in the treatment of depression, and is generally well tolerated by patients . Its use during pregnancy should be avoided, as it carries a higher risk of birth defects than other antidepressants.

Rp.
Seroxat tablet 0.02
Scatulam originalem N º I (unam)
D. S. Take one tablet a day .

5. Venlafaxine is a new tetracyclic antidepressant that inhibits the reuptake of both serotonin and noradrenaline in nerve endings. In some patients, it can cause an increase in intraocular pressure and hypertension.

Rp.
Velafax tablet 0.0375
Scatulas originales No. II (duas)
D. S. Take one tablet twice a day .

6. Escitalopram works by inhibiting the reuptake of serotonin in the nerve endings, which explains its antidepressant effect. Among the somatic side effects of this drug, the most significant are hyponatremia (due to reduced secretion of antidiuretic hormone) and bleeding in the subcutaneous tissue.

Rp.
Escitalopram tablettae 0 , 01
Da scatulam originalem N º I (unam)
S. One tablet a day .

ANXIOLYTICS

We talk about fear when there is a clearly defined phenomenon that causes it, while anxiety is a general anxiety that is not related to a specific phenomenon. Anxiolytics are drugs that relieve anxiety, but have a sedative and hypnotic effect in larger doses.

7. Diazepam is a benzodiazepine preparation that has anxiolytic, sedative, hypnotic, anticonvulsant and mild muscle relaxant effects. It has a wide therapeutic range. Its effect lasts a long time, because it is slowly eliminated from the body.

Rp.
Bensedin tablettae 0.005
Scatulam originalem N º I (unam)
D. S. Take one tablet twice a day .

8. Midazolam is a benzodiazepine with a short half-life (2-4 hours) , which in parenteral form is used, among other things, to cause conscious sedation in unpleasant or painful diagnostic procedures . An intravenous injection of 2 mg is administered first, then 1 mg may be added until the desired degree of sedation is achieved. The total dose should not exceed 7 mg.

Rp.
Dormicum ampullae 0.005
Da tales ampullas N º X (decem)
S. Ad manum medici.

9. Nitrazepam is a benzodiazepine that can also be used as a hypnotic:

Rp.
Nitrazepam tablettae 0,005
Da scatulam originalem N º I (unam).
S. Take one tablet before going to bed .

INTRAVENOUS ANESTHETICS

Intravenous anesthetics are used to induce short-term general anesthesia (for performing short-term painful interventions) and to introduce the patient to inhalational general anesthesia.

10. Etomidate is an intravenous anesthetic that causes minimal cardiovascular and respiratory depression. It is used for induction of anesthesia in people with heart failure.

Rp.
Hypnomidate amp. 0,02
Da tales ampullas N º X (decem)
S. Ad manum medici.

11. Propofol is an intravenous anesthetic used to induce and maintain general anesthesia. Its effect lasts ten minutes. It can cause convulsions in people being treated for epilepsy. Dose: 2.5 mg/kg intravenously .

Rp.
Deprived amp. 0,02
Da tales ampullas N º III (tres)
S. Ad manum medici.

LOCAL ANESTHETICS

Local anesthetics block sodium channels in the membrane of nerve fibers that transmit information about pain.

12. Procaine is a local anesthetic of the ester type, which is mostly used for infiltrative anesthesia (in a concentration of 0.5 to 1%). In one application, no more than 600 mg should be given . Larger doses are absorbed from the site of administration and cause hypotension and stimulation of the central nervous system (up to convulsions). Procaine can be prescribed as a magisterial preparation (20 mg/ml is the concentration that should be achieved in the preparation):

Rp.
Procaini chloridi 1,0
Aquae pro injectionead 50,0
Misce fiat solutio. Sterilisa.
Da ad vitrum collo amplo.
Signa suo nomine. Ad manum medici.

13. Lidocaine is a local anesthetic of the amide type, which is stronger than procaine and to which the patient is less likely to develop an allergy. Its effect starts after about 10 minutes after injection and lasts for 1-2 hours. In addition to local anesthesia, lidocaine is used to treat ventricular arrhythmias. One original box of the ready-made preparation Lidocaine-chloride 1% ® contains 10 ampoules with 3.5 ml of 1% lidocaine solution each.

Rp.
Lidocaine chloride amp. 0.035
Da scatulam originalem N º I (unam)
S. Ad manum medici.

BARBITURATES

Barbiturates are drugs with sedative, hypnotic and anticonvulsant effects. They are mainly used to prevent seizures in tonic-clonic epilepsy and complex partial types of epilepsy (psychomotor epilepsy is the old name).

Their most important side effect is respiratory depression. Of all barbiturates, phenobarbitone and thiobarbiturates for i. v. anesthesia are most often used today.

14. Phenobarbitone is used to treat tonic-clonic generalized seizures and partial epilepsy at a dose of about 200 mg per day.

Rp.
Phenobarbiton tabl. 0,1
Scatulam originalem N º I (unam)
D. S. Take one tablet in the evening before going to bed .

ANTIEPLEPTICS

15. Carbamazepine is an antiepileptic effective in the treatment of partial epilepsies and generalized tonic-clonic seizures. In addition, it is used to treat neuralgia and the manic phase of bipolar psychosis. It causes ataxia, drowsiness and visual disturbances as side effects.

Rp.
Carbapine tabl. 0,2
Scatulam originalem N º I (unam)
D. S. Take one tablet in the morning and one in the evening .

16. Valproic acid is an antiepileptic with the widest spectrum of action: it is effective in epilepsy, generalized tonic-clonic seizures, myoclonic seizures and partial epilepsy. It is also used in the prophylaxis of migraine, and for the treatment of bipolar disorder. The preparation Eftil ® contains 333 mg of sodium valproate and 145 mg of valproic acid in one delayed-release tablet:

Rp.
Eftil tabl.
Da scatulam originalem N º I (unam)
S. Take one tablet twice a day .

DRUGS FOR PARKINSON'S DISEASE

This group of drugs includes drugs that enhance dopamine transmission in the central nervous system and drugs that block cholinergic transmission.

17. Levodopa is an amino acid that is converted into dopamine in the central nervous system. The most common side effects are nausea and vomiting, but after prolonged use it can lead to dyskinesias and psychological disorders. To reduce the breakdown of levodopa in the periphery, it is administered together with dopa-decarboxylase inhibitors: carbidopa or benserazide. The preparation Madopar HBS contains levodopa (100 mg in one capsule) and benserazide (25 mg in the same capsule):

Rp.
Madopar HBS capsulae
Scatulam originalem N º I (unam)
D. S. Take one capsule three times a day.

18. Entacapone is an antiparkinsonian drug that reversibly inhibits catechol-o-methyl transferase, thereby slowing down the breakdown of levodopa in peripheral tissues. It is given only with levodopa preparations with dopa-decarboxylase inhibitors . With each dose, e.g. levodopa/benserazide combination, one tablet of entacapone 200 mg is given.

Rp. Comtan tabl. 0,2
Scatulam originalem N º I (unam)
D. S. Take one tablet with each dose of levodopa.

OPIOID ANALGESICS

Opioid analgesics weaken the perception of pain and change the reaction to it by acting through their receptors in the central nervous system. They are very effective in suppressing pain, but their use is fraught with the danger of causing respiratory depression. In addition, these drugs can be addictive (psychologically and physically).

19. Morphine is the prototype opioid analgesic. It is a natural alkaloid from the resin obtained by cutting unripe pods of the opium poppy (Figure 9). Dose: 10 mg injected subcutaneously every 4 hours .

Rp.
Morphine hydrochloride Molteni amp. 0,02
Da tales ampullas N º X (decem)
S. Ad manum medici.

Picture 9. Opium poppy

20. Methadone is a synthetic substance with a pronounced agonistic effect on μ receptors. It has a longer effect than morphine (6-

8 hours) and can be administered orally. In our country, a preparation in the form of drops for internal use, which is mostly used for chronic therapy of incurable addicts, is registered .

Rp.
Methadone guttae 10 ml (10 mg/ml)
Scatulam originalem N º I (unam)
D. S. Take 15 drops with a little water every 5 hours.*

* One ml of this solution contains 30 drops.

21. Petantin (synonyms: meperidine, pethidine) is also a μ agonist that differs from morphine and methadone in its lower tendency to cause respiratory depression. It is used for analgesia during childbirth. Its effect lasts 2-4 hours. Average single dose: 50 milligrams intramuscularly .

Rp.
Dolantin 100 amp. 0,1
Da tales doses N º XII (duodecim)
S. Ad manum medici.

22. Oxycodone is full of agonists all three types of opioid receptors . It has an analgesic, sedative and anxiolytic effect . It is used to treat postoperative pain and pain experienced by cancer patients.

Rp.
Codexy caps. 0,01
Scatulam originalem N º I (unam)
D. S. Take one capsule of the medicine every 6 hours .

ANTIPIRETIC ANALGESICS AND ANTI-INFLAMMATORY DRUGS

Preparations from this group act on the periphery by blocking cyclooxygenase, a key enzyme in the synthesis of prostaglandins, mediators of inflammation.

23. Acetylsalicylic acid is the first discovered preparation from this group. It successfully relieves mild and moderate pain; it has an irritating effect on the mucous membrane of the stomach and worsens the condition of patients with asthma. It is not advisable to give it to

children because of the significant risk of fatal Reye's syndrome. Analgesic and antipyretic doses: 300-900 milligrams every 4-6 hours. Anti-inflammatory dose: 4-8 g of aspirin per day, divided into several doses .

Rp.
Aspirin 500 tabl. 0,5
Scatulam originalem N º I (unam)
D. S. Take one tablet four times a day.

24. Acetyl-salicylic puferettae are sold under the name Acetisal pH 8 ® and contain 500 mg of the active substance. They can also be bought without a prescription:

Rp.
Acetisal pH 8 tablet 0 , 5
Da tales tablettas N º X (decem)
S. Two tablets three times a day

25. Paracetamol (acetaminophen) has only analgesic and antipyretic effects. It is used as an antipyretic in children, where overdose must be avoided because it can lead to severe centrolobular necrosis of the liver. The antidote for overdose is acetylcysteine. It is suitable for use in people who have gastritis or ulcers, because it does not additionally damage the mucous membrane of the stomach . It is also safe to use during pregnancy. The maximum daily dose is 4 g.

Rp.
Paracetamol tab. 0.5
Da tales tablettas N º XX (viginti)
S. Take one tablet four times a day.

26. Diclofenac is an analgesic, antipyretic and anti-inflammatory agent that is often used to treat rheumatic diseases. It has an irritating effect on the mucous membrane of the gastrointestinal tract and can lead to bone marrow and kidney damage. Its use is also contraindicated in patients with heart disease, as it increases the frequency of heart attacks and other major adverse cardiovascular events.

Rp.
Diclofen tabl. 0,05
Scatulam originalem N º I (unam)
D. S. Take one tablet twice a day .

27. Acetic acid derivatives (Brufen ®) and flurbiprofen (Flugalin ®) are non-steroidal anti-inflammatory drugs drugs used to treat mild pain :

Rp.
Brufen tabl . 0 , 4
Occlusionem praeformatam N º I (unam).
D. S. Take one tablet twice a day .

28. Flurbiprofen

Rp.
Flugalin tabl. 0 , 5
Da scatulam originalem N º I (unam).
S. Take one tablet three times a day .

DRUGS THAT MODIFY THE COURSE OF RHEUMATOID ARTHRITIS

Anti-inflammatory drugs lead to symptomatic improvement, but do not affect the progression of the disease. Medicines that affect immune mechanisms can slow down the progression of rheumatoid arthritis, but attention should also be paid to their side effects .

29. Tocilizumab is a humanized monoclonal antibody against the interleukin 6 (IL6) receptor. Since IL6 is a pro-inflammatory cytokine, blocking its action reduces inflammation in rheumatoid arthritis . Tocilizumab is administered once every 4 weeks, as an IV infusion (8 mg/kg).

Rp.
Actemra lagena 0,4
Da tales doses N º II (duas)
S. Ad manum medici.

CHOLINERGIC DRUGS

Cholinergic drugs are all substances that mimic the activation of the parasympathetic part of the autonomic nervous system. They are also called parasympathomimetics.

30. Pilocarpine is an alkaloid obtained from the leaves of the plant Pilocarpus microphyllus that acts as an agonist of muscarinic receptors. It is used in the form of eye drops in the treatment of glaucoma. It is sensitive to light. The concentration of pilocarpine in these drops is between 0.5 and 4%. Miosis and spasm of accommodation occur after 20 minutes of application and last 4-8 hours. Pilocarpine eye drops can be prescribed as a magisterial preparation (1%) :

Rp.
Pilocarpini chloridi 0,1
Natrii chloridi 0,08
Aquae pro injectionead 10,0
Misce fiat solutio. Sterilisa.
Da ad vitrum nigrum cum pipetta.
S. Externally, instill one drop into the patient three times a day eye.

31. Ready-made preparation of pilocarpine in the form of eye drops.

Rp.
Myocarpine oculoguttae 10 ml (2%)
Da scatulam originalem N °I (unam)
S. Externally, instill one drop into the patient three times a day eye.

32. Neostigmine is an acetylcholinesterase inhibitor used in the treatment of myasthenia gravis and to accelerate recovery from neuromuscular paralysis caused by non-depolarizing neuromuscular blocking agents. Side effects resemble excessive activation of the parasympathetic nervous system.

Rp.
Neostigmine amp. 0,0025
Da tales ampullas N º And (unam)
S. Ad manum medici.

33. Physostigmine is an alkaloid obtained from the seeds of the plant Physostigma venenosum that acts as an acetylcholinesterase blocker. Since, unlike neostigmine, physostigmine penetrates the blood-brain barrier, it is rarely used systemically. Its the most frequent application is in the form of eye drops in the treatment of glaucoma. It is sensitive to light, and it breaks down quickly in the solution, so the eye drops must always be freshly prepared. The therapeutic concentration of physostigmine salicylate is between 0.2 and 0.5%. Since there are no ready-made preparations, it must be prescribed magisterially:

Rp.
Physostigmini salicylatis 0,03
Acidi borici 0,3
Aquae pro injectione ad 10,0
Misce fiat solutio.
Da ad vitrum nigrum cum pipetta.
S. Externally, instill one drop into the patient twice a day.

ANTICHOLINERGIC DRUGS

Medicines from this group block muscarinic receptors .

34. Atropine is an alkaloid obtained from the fruits of nightshade (Atropa belladonna). It blocks muscarinic receptors in both the peripheral and central nervous systems. It is used to treat bradycardia, gastrointestinal disorders, in preanesthetic medication and (in the form of eye drops) as a mydriatic and cycloplegic (causes accommodation paralysis). For the treatment of uveitis and iridocyclitis, we can prescribe 1% drops of atropine sulfate:

Rp.
Atropini sulphatis 0,05
Aquae purificatae ad 10,0
Misce fiat solutio. Sterilisa.

Da ad vitrum cum pipetta.
S. Externally, two to three times a day instill one drop in the diseased eye.

Such large doses of atropine sulfate are given because of the accelerated removal of the drug from the inflamed eye; when atropine is used to induce mydriasis and cycloplegia to measure the refractive power of a healthy eye, it is sufficient to instill one drop 1 hour before the examination. Then the mydriasis lasts for a week!

35. Homatropin is a muscarinic receptor blocker with similar effects in the body as atropine (since it is a quaternary ammonium compound that does not penetrate the central nervous system). When instilled into the eye, its effect starts faster than atropine and lasts less (about 1 day). It is mainly used to determine the refraction of the eye as a 1-5% solution of hydrobromide (two drops with an interval of 10 minutes in about 30 minutes before the examination). We will prescribe it magisterially:

Rp.
Homatropini bromidi 0,2
Natrii chloridi 0,06
Aquae pro injectione ad 10,0
Misce fiat solutio.
Da ad vitrum nigrum cum pipetta.
S. Ad manum medici.

SPASMOLITICS

36. Scopolamine buthyl bromide is an antimuscarinic spasmolytic that leads to relaxation of the smooth muscles of the gastrointestinal, biliary and urinary tracts. That is why it is used (orally or parenterally) to suppress biliary and renal colic, as well as to treat spasms of the stomach and duodenum that accompany ulcers and other diseases. The oral preparation of this drug is:

Rp.
Buscopan drag. 0,01
Scatulam originalem N º I (unam)
D. S. Take one dragee three times a day .

37. Scopolamine buthylbromide can also be used as an intravenous or intramuscular injection. Ready-made preparation Buscopan ® contains 20 mg of this drug in one ampoule . There are 6 ampoules in one box .

Rp.
Buscopan amp. 0,02
Scatulam originalem N º I (unam)
DS Ad manum medici.

38. Baralgetas. In practice, preparations in which spasmolytics are combined with non-opioid analgesics are widely used. If the analgesic is one of the pyrazolone derivatives, a doctor should be cautious because that group of analgesics has a high potential for causing agranulocytosis. One such preparation is Baralgetas® (analgesic metamizole, spasmolytics fenpiverinium and pitophenone).

Rp.
Baralgetas amp.
Da scatulam originalem N º I (unam)*
S. Ad manum medici.

* Most often, there are several ampoules (usually 5) in the original box.

ADRENERGIC MEDICINES

Adrenergic drugs (synonym: sympathomimetics) are substances whose actions in the body imitate the activation of the sympathetic nervous system.

39. Salbutamol is a selective β_2 receptor agonist. It is used for the treatment of bronchial asthma attacks in the form of inhalation, orally or parenterally. The danger in its application lies in the excessive stimulation of the heart in people with narrowed coronary arteries.

Rp.
Ventolin aerosol 200 doses (0.1 mg/dose)
Scatulam originalem N º I (unam)
D. S. During asthmatic attack, inhale once a spray from the pump.

40. Salmeterol is a selective β_2 receptor agonist, but unlike salbutamol, it has a prolonged action. Like salbutamol, it leads to relaxation of the bronchial muscles. It is used for prevention of asthma attacks, but only if the patient simultaneously uses corticosteroids:

Rp.
Serevent Inhaler CFC-Free aerosol 120 doses (25 μg/dose)
Da scatulam originalem N ^{o} I (unam)
S. Inhale the spray from the pump twice in the morning and in the evening.

41. Ipratropium bromide. In the treatment of bronchospasm attacks in chronic obstructive pulmonary disease by inhalation, adrenergic drugs are often combined with the antimuscarinic drug ipratropium bromide (Berodual N® = fenoterol /0.05 mg/ml/ + ipratropium bromide /0.025 mg/ml/):

Rp.
Berodual N aerosol 15 ml
Da lagenam originalem N ^{o} I (unam)
S. In case of an asthma attack, first exhale strongly and then together with with the next deep breath press the pump and hold the air for about 10 seconds.

42. Ephedrine is a sympathomimetic that releases noradrenaline from nerve endings, but also directly activates adrenergic receptors. Because it penetrates the central nervous system, it is rarely used systemically; it is mainly used to decongest the nasal mucosa during rhinitis. Ephedrine develops tachyphylaxis quickly, so it can only be used every other day (in order to refill the presynaptic vesicles with noradrenaline in 24 hours). It can be prescribed magisterially:

Rp.
Ephedrini chloridi 0,1
Aquae purificatae ad 10,0
M. f. s.
Da ad vitrum cum pipetta.
S. Externally, three times a day instill one drop in both nostrils. After one day of application, pause for 24 hours.

43. Ephedrine. Ready-made preparation of ephedrine :

Rp.
Ephedrine rhinoguttae 10 ml (0.5%)
Da scatulam originalem N º I (unam)
S. Externally, three times a day instill one drop in both nostrils. After one day of application, pause for 24 hours .

44. Adrenaline is a catecholamine that activates all adrenergic receptors, especially the beta type. It is the drug of choice for cardiac arrest and anaphylactic shock. In these acute conditions, it is administered intravenously in a dose of 0.3 mg (in about 10 ml of physiological solution). The injection can be repeated after 30-60 minutes, given that adrenaline breaks down quickly in the body.

Rp.
Adrenalin HCL 1:1000 amp. 0,001
Da tales ampullas N º XII (duodecim)
S. Ad manum medici.

DRUGS AGAINST BRONCHIAL ASTHMA AND LUNG EDEMA

45. Aminophylline is a combination of theophylline (main drug) and ethylenediamine (adjuvant: increases the solubility of theophylline in water). Theophylline increases the concentration of cAMP in cells, so its action in the body is very similar to the action of a drug that activates beta receptors.

It is used for the treatment of acute pulmonary edema or for stopping an attack of bronchial asthma (dose: by slow intravenous injection - 20 minutes, a loading dose of 2.5-3 mg/kg of body weight should be given; then a maintenance dose of 0.5 mg/kg/h should be given as an infusion. Theophylline has a narrow therapeutic range (it has a toxic effect on the heart and CNS), so it is recommended to measure its concentration in the blood during therapy.

Rp.
Aminophylline amp. 0,25
Da tales doses N º XII (duodecim)
S. Ad manum medici.

ADRENERGIC BLOCKERS

Adrenergic blockers are drugs that bind to adrenergic receptors, do not activate them, but prevent the binding of endogenous neurotransmitters (noradrenaline and adrenaline).

46. Bisoprolol is a selective blocker of β_1 receptors that dominate in the myocardium. It is used to treat hypertension, angina pectoris and arrhythmias. It is eliminated both through the liver and through the kidneys, so it is not necessary to adjust the dose if one of those two organs has failed.

Rp.
Tensec tabl. 0,005
Scatulam originalem N º I (unam)
D.S. Take one tablet every day

47. Carvedilol is a non-selective blocker of adrenergic receptors, which blocks both α and β receptors. This drug uses the positive effects of blocking both types of receptors (it leads to vasodilatation by α blockade and to a decrease in renin secretion due to β blockade).

Unlike selective α blockers, it does not lead to an increase in blood cholesterol. It is indicated for the treatment of heart failure, hypertension and angina pectoris.

Rp.
Dilatrend tabl. 0,00625
Da scatulas originales N º II (duas)
S. Take one tablet every 12 hours.

48. Methylergometrine is a methylated alkaloid of ryegrass that is registered in our country in the form of drops, tablets and ampoules for use as a uterotonic:

Rp.
Methylergometrine amp. 0.1
Da tales ampullas N º III (tres)
S. Ad manum medici.

49. Propranolol is a non-selective β-blocker receptor that penetrates into the CNS and exerts a stabilizing effect on excitable

membranes. It is used to treat hypertension, supraventricular arrhythmias, angina pectoris, essential tremor, and hypertrophic subaortic stenosis. For the treatment of hypertension, it is administered orally:

Rp.
Propranolol tabl. 0,04
Scatulam originalem N° I (unam)
D. S. Take one tablet twice a day.

50. Doxazosin is selective α_1 a blocker that leads to dilation of blood vessels. It is used to treat hypertension and benign prostatic hyperplasia. The most important side effect is postural hypotension, especially after the first dose of the drug. Dose for treatment of hypertension: 1 mg orally once daily.

Rp.
Doxazosin tablettae 0,001
Scatulam originalem N ° I (unam)
D.S. Take one tablet once a day .

H_1 RECEPTOR BLOCKERS

H_1 receptor blockers are used to treat diseases related to the release of endogenous histamine from mast cells and basophils.

51. Diphenhydramine is an H_1 histamine receptor blocker used to treat short-term insomnia. In addition to the hypnotic effect, it has an anti-allergic, anti-emetic, anti-cholinergic and anti-pruritic effect. The dose of diphenhydramine is 50 mg orally, in the evening before going to bed.

Rp.
Calmaben tablettae 0,05
Scatulam originalem N ° I (unam)
D.S. Take one tablet half an hour before going to bed, with plenty liquids.

52. Loratadine is an H_1 antihistamine that penetrates the brain poorly, so the occurrence of sedation is much less frequent. It should

not be given to people who are taking erythromycin, ketoconazole, itraconazole or grapefruit juice at the same time, because dangerous heart arrhythmias can occur due to the interaction of these drugs with loratadine at the level of metabolism in the liver.

Rp.
Loratadine Cipla tabl. 0,01
O.p. N ^{o} I (unam)*
D.S. Take one tablet a day.

*This type of formulation is most often seen in medical practice because of its brevity. It stands for " Oclusionem praeformatam " - original packaging

CARDIOTONIC GLYCOSIDES

Cardiotonic glycosides inhibit the work of sodium-potassium ATPase in the membrane of myocardial cells and thereby increase the concentration of calcium in the cytoplasm. The final effect is an increase in the force of cardiac contraction without a significant increase in oxygen consumption in the myocardium.

53. Digoxin increases the force of cardiac contraction and slows the conduction of impulses through the A-V node. It is used to treat congestive heart failure accompanied by atrial fibrillation, as well as to suppress supraventricular paroxysmal tachycardia. It has a very narrow therapeutic range: already in therapeutic doses it has an arrhythmogenic effect. Due to the long half-time of elimination (36 hours), a loading dose should be given at the beginning of the treatment in order to quickly achieve the therapeutic concentration of the drug in the blood. The loading dose is 1 mg divided into three doses within 24 hours; from the next day, a maintenance dose of 0.25 mg is given. After every five days of application, it is advisable to take a break in taking the drug for two days. This reduces the possibility of accumulation of the drug to toxic concentrations during chronic therapy.

Rp.
Dilacor tablet. 0,00025
Scatulam originalem N ^{o} I (unam)
D.S. On the first day, take one tablet four times.
Then take one tablet a day. After five days
take a break of two days.

54. Digitoxin is a cardiotonic with the same effect as digoxin. It differs from it in the route and length of elimination (it is excreted with the bile, the half- time of elimination is about 7 days). It is used rarely (due to a greater tendency to accumulate in the body), mainly in patients with impaired kidney function. The starting dose is 0.6 mg, and the maintenance dose is 0.1 mg.

It is no longer registered in our country; during the validity of the previous editions of the pharmacopoeia, it was officially prescribed:

Rp.
Digitoxini tablettarum 0,0001
Da tales doses N º XL (quadraginta)
S. On the first day, take two tablets three times a day, then one tablet a day. After five days of application, pause for two days.

ANTIARRHYTHMICS

55. Amiodarone is currently the antiarrhythmic with the strongest effect, because it has multiple mechanisms of action: it blocks sodium channels, blocks beta receptors, blocks calcium channels and potassium channels. Very rarely, amiodarone has a proarrhythmogenic effect, but it can cause dose-dependent liver damage with an increase in transaminases, lung fibrosis and grayish discoloration of the skin due to deposition in the dermis.

Rp.
Amiodarone tabl. 0,2
Da tales tablettas N º XXX (triginta)
S. Take one tablet three times a day.

56. Verapamil is a calcium channel blocker used to treat supraventricular arrhythmias, angina pectoris and hypertension. It is well tolerated, but its intravenous administration in patients on chronic beta blocker therapy is dangerous: it can cause asystole or heart block. Due to rapid first-pass degradation in the liver, there is a large difference between oral and parenteral doses. The intravenous dose for suppression of supraventricular arrhythmia is 5-10 mg . The oral dose for treating arrhythmias is:

Rp.
Verapamil tabl. 0,04
Scatulam originalem N° I (unam)
D. S. Take one tablet three times a day.

ANTIHYPERTENSIVES

Medicines for hypertension work in some of the following ways: (1) reduce the volume of extracellular fluid (diuretics); (2) reduce sympathetic tone by central action (methyldopa); (3) lead to vasodilation (vasodilators, alpha blockers); (4) reduce the stroke volume of the heart (beta blockers); (5) reduce renin synthesis (peptidyl-dipeptidase blockers).

57. Nifedipine is a calcium channel blocker that directly dilates arterioles and thereby reduces peripheral resistance. It is used to treat hypertension and angina pectoris. Side effects are headache, gingival hyperplasia and edema around the malleoli. For the treatment of hypertension, it is administered orally :

Rp.
Nifelat tabl. 0,02
Scatulam originalem N° I (unam)
D.S. 2x1 tablet per day during or after eating.

58. Alpha-methyldopa is a centrally acting antihypertensive. A metabolite of methyldopa, alpha-noradrenaline, activates α_2 receptors in the cardiovascular center in the medulla oblongata and thus reduces the sympathetic tone in the body.

Methyldopa is used to treat moderate to severe hypertension, but only in combination with other antihypertensive drugs. It is administered orally. After prolonged administration, it can cause over-sedation, fluid retention and hemolytic anemia.

Rp.
Methyldopa tabl. 0,25
Scatulam originalem N° I (unam)
D. S. Take one tablet twice a day.

59. Enalapril is a peptidyl-dipeptidase (angiotensin-converting enzyme) inhibitor administered orally for the treatment of hypertension

and chronic heart failure. It is a pro-drug that is converted in the body into the active form, enalaprilat. Side effects are cough, angioedema and kidney damage in people with narrowed renal arteries. The dose of enalapril is 5 milligrams per day.

Rp.
Prilenap tabl. 0,01
Scat. orig. N º I (unam)
D.S. Take one tablet every day.

60. Captopril is a prototype antihypertensive drug from the group of ACE inhibitors. In addition to it, there are numerous drugs from the same group, but it is still widely used, primarily for the treatment of hypertensive emergencies.

Rp.
Zorcaptil tabl. 0,025
Da scatulam originalem Nº I (unam).
S. One tablet twice a day.

VASODILATORS

Vasodilators are drugs that relax the smooth muscles in the walls of blood vessels and increase their lumen.

61. Papaverine is a vasodilator with a direct effect on the smooth muscles of blood vessels. It is used for the treatment of occlusive diseases of the arteries of the brain and extremities, but without a major effect. The only justified indication for the use of papaverine is impotence, but in that indication it has been replaced today by more effective drugs - phosphodiesterase type 5 inhibitors (sildenafil and others). In such patients, it is administered as an intracavernous injection (20 mg is injected into the corpus cavernosum of the penis, no more than 2 times a week). Since there is no ready-made preparation of papaverine, it must be prescribed by prescription (one milliliter of solution contains 40 mg of papaverine):

Rp.

Papaverini chloridi	0,4
Aquae pro injectione ad	10,0

Misce fiat solutio. Sterilisa.

Da ad vitrum collo amplo.
Signa suo nomine. Ad manum medici.

62. Isosorbide-dinitrate is a vasodilator from the nitrate group that dilates mainly venous blood vessels. It is used for prophylaxis and treatment of angina pectoris and treatment of congestive heart failure. It is administered orally (the action starts in about 1 hour and lasts 4-6 hours) or sublingually (the action starts in 3 minutes and lasts 2 hours). The most common side effect is headache .

Rp.
Cornillat tabl. 0,02
Scatulam originalem Nº I (unam)
D. S. Take one tablet three times a day.

63. Glyceryl trinitrate is a vasodilator with very fast elimination from the body (half- time of elimination is about 5 minutes), which is used in the form of lingual or transdermal patches to suppress angina pectoris attacks. Its effect starts in 1 minute and lasts 30-60 minutes .

Rp.
Nitroglycerin ling . 0,0005
Scatulam originalem Nº I (unam)
D. S. At the onset of chest pain, immediately put one tablet under the tongue.

64. Diltiazem is a vasodilator from the group of calcium channel blockers. It is used to treat spastic angina pectoris and hypertension. It mainly dilates coronary and peripheral arterial blood vessels, but has a certain depressant effect on the cells of the conducting system in the heart .

Rp.
Cortiazem retard tabl. 0,09
Scatulam originalem Nº I (unam)
D. S. Take one tablet twice a day.

DIURETICS

Diuretics are medicines which increase the quantity of the excreted urine.

65. Furosemide is diuretic of Henle's loops which has the highest efficiency of all diuretics that are known to date. Unwanted effects are hypokalemia, hyponatremia, hypochloremia, alkalosis, hyperglycemia, impairment of hearing (especially with too fast intravenous administration). It is used for the treatment of edema resistant to the treatment of the weaker diuretics and especially for the treatment of the lung edema. It is administered I.V. or I.M. 40 mg furosemide.

Rp.
Lasix amp. 0,02
Da tales ampullas N º X (decem)
S. Ad manum medici.

66. Spironolactone is a blocker of aldosterone receptors that prevents reabsorption of sodium and excretion of potassium. It is used for treatment of the refractory edema when nephrotic syndrome and portal hypertension are in question. Adverse effects are hyperkalemia, gynecomastia and menstrual cycle disorders.

Rp.
Spironolactone tabl. 0,025
Scatulam originalem Nº I (unam)
D.S. Take one tablet per day.

67. Indapamide is a diuretic similar to thiazide diuretics. It is used to treat edema, hypertension and renal calculus (because it reduces calcium excretion). It is characterized by a long elimination half-life (14-18 hours), so it can be applied only once a day.

Rp.
Indapres filmtabl. 0,0025
Scatulam originalem Nº I (unam)
D. S. To take one tablet a day.

68. Hydrochlorothiazide is a thiazide diuretic that is used for the treatment of edema and hypertension. Adversed effects are: hypokalemia, hyponatremia, hypochloremia, alkalosis, hyperglycemia,

increase of cholesterol and triglycerides in blood. In case of chronic renal insufficiency it does not have any effect.

Rp.
Dynorm tabl. 0,025
Scatulam originalem N° I (unam)
D. S. To take one tablet a day.

69. Lometazide. There are ready-made preparations in which thiazide diuretics are combined with potassium-sparing diuretics. In this way, a synergistic diuretic effect is achieved and the risk of hyperkalemia is reduced. One of these widely used drugs is Lometazide® (amiloride /5 mg/ + methyclothiazide /10 mg/)

Rp.
Lometazide tabl
Da scatulam originalem N° I (unam)
S. Take one tablet per day.

MEDICINES WHICH AFFECT COAGULABILITY OF BLOOD

70. Acenocoumarol (derivative of coumarin) is an anticoagulant agent which is applied orally. It inhibits the synthesis of coagulation factors in the liver and in that way it reduces the coagulability of blood. It is used for the treatment of the deep vein thrombosis and the pulmonary embolism. When using acenocoumarol, the prothrombin time should be twice as long as the control; in case of a longer duration, reduce the dose.

Rp.
Sinkum 4 tabl. 0,004
Scatulam originalem N° I (unam)
D.S. Take one tablet two times per day.

71. Heparin is a medicine that is used for quick reduction of the coagulability of blood: in pulmonary embolism, in acute cerebral ischemia due to the developing thrombosis, in deep venous thromboses and elsewhere. Of all anticoagulants, it is the only one that can be used

in pregnancy! There are standard heparin preparations (Heparin ®amp. 5000 IJ and 25000 IJ) and low molecular weight heparin, nadroparin (Fraxiparine ®):

Rp.
Fraxiparin sirettae 2850 IJ
Da tales sirettas N º II (duas)
S. Ad manum medici .

72. Vitamin K_1 (phytomenadione) is liposoluble vitamin which is necessary for the carboxylation of coagulation factors in the liver. Its deficiency leads to an increased tendency to bleed. It is used prophylactically in newborns (1 mg IM) and in the patients with obstructive icterus (10-40 mg per day and i.m.), as well as in the treatment of the overdoses of oral anticoagulant drugs. In 1 box of Konakion MM ® preparation there are 25 ampoules with 10 mg of phytomenadione each.

Rp.
Konakion MM amp. 0,01
Da scatulam originalem N º I (unam)
S. Ad manum medici.

ANTI-ANAEMIC MEDICINES

73. Iron preparations. Iron is a necessary ingredient of hemoglobin, myoglobin and cytochrome. A lack of iron reflects in the hypochromic microcytic anemia. The dose of iron should be calculated based on the assessment of its defficiency in the body (1 litre of blood of the healthy person contains 145g of hemoglobine containing 500mg of the iron). The problem with oral administration of iron is its highly irritating effect on the mucous membrane of the digestive tract, which is why iron preparations for intravenous administration are often used: for example, iron (III) hydroxide sucrose complex.

Rp.
Ferrovin lagenae 0,1
Da tales lagenas N º V (quinque)
D.S. Ad manum medici.

74. Folic acid is in its tetrahydro-form necessary for the synthesis of thymidine, a base that participates in the construction of DNA. Megaloblastic anemia occurs with folic acid deficiency. However, since megaloblastic anemia can also be caused by vitamin B12 deficiency (which also causes neurological disorders), treatment with folic acid should not be started until it is determined whether there is a vitamin B12 deficiency. The dose for the treatment of megaloblastic anemia is 5 mg per day for 4 months.

Rp.
Folnak tabl. 0,005
Scatulam originalem N° I (unam)
D.S. Take one tablet once a day.

75. Vitamin B12 is necessary for the reactivation of tetrahydrofolic acid from methyl-tetrahydrofolic acid and for the synthesis of methionine from homocysteine. Lack of this vitamin leads to megaloblastic anemia and funicular myelosis. If vitamin B12 deficiency is caused by total gastrectomy, the patient should receive 1000 μg of hydroxycobalamin i.m. for the rest of his life every 60 days.

Rp.
OH B12 amp. 0,0025
Da tales doses N ° X (decem)
S. Ad manum medici.

INTRAVENOUS SOLUTIONS

The deficit of fluid in a patient can be compensated by introducing the solution orally or parenterally (most often intravenously).

76. Glucose for parenteral application. For fluid replacement, a 5% glucose solution, which is isotonic with blood plasma, is the most often used. We will prescribe a ready-made preparation of 5% glucose:

Rp.
Glucosi infundibile 5% 500 ml
Da occlusionem praeformatam N ° I (unam)
S. Ad manum medici.

77. Ringer's solution is a physiological solution that is used for oral and parenteral fluid compensation. It contains: sodium 147 (mM/l), potassium 4 (mM/l), calcium 3 (mM/l) and chloride 157 (mM/l).

Rp.
Sodium chloride and infundibile compositum 500 ml
Da occlusiones praeformatas N º II (duas)
S. Ad manum medici.

DRUGS AGAINST RESPIRATORY DISORDERS

78. Butamirate is a non-opioid antitussive, which by acting on the cough center reduces its sensitivity to peripheral irritants, thus suppressing cough. It is used to suppress dry cough.

Rp.
Omnitus tablettae 0,05
Da tales doses N º XII (duodecim)
S. Take one tablet every 12 hours .

79. Bromhexine is an expectorant of synthetic origin that increases the depth of the mucouls layer in the bronchi. It is used to treat chronic, productive cough because it facilitates the expectoration of secretions. The daily dose of bromhexine is 4-16mg, three times a day, orally.

Rp.
Bisolvon tabl. 0,008
Scatulam originalem N º I (unam)
D. S. Take one tablet three times a day .

80. Potassium - iodide has an expectorant effect because it increases the thickness of the mucous layer of bronchial secretions. In addition, it is used for the treatment of cutaneous lymphatic sporotrichosis and for preoperative preparation of the thyroid gland for surgery (together with elemental iodide). The mean single expectorant dose is 300mg; since it irritates the mucous membrane of the stomach, it should be applied diluted in plenty of water. It is prescribed magisterially:

Rp.
Kalii iodidi 6.0
Aquae purificatae ad 300.0
Misce fiat solutio.
Da ad vitrum nigrum.
S. Stir one tablespoon of the solution three times a day in the glass of water and drink it. Drink one glass of water immediately afterwards.

MEDICINES AGAINST DISEASES OF THE DIGESTIVE TRACT

81. Omeprazole is a proton pump inhibitor that supresses the secretion of hydrochloric acid in the stomach. It is used to treat duodenal and gastric ulcers.

Rp.
Omeprazole caps. 0,02
Scatulam originalem N° I (unam)
D.S. In the morning, before eating, take one capsule.

82. Ranitidine is a blocker of H_2 histamine receptors and is used to treat the same conditions as omeprazole. We will prescribe ranitidine for parenteral administration. The dose is 50 mg intravenously or intramuscularly every 8 hours (before the intravenous injection, 50 mg of ranitidine must be diluted in 20 ml of saline).

Rp.
Ranisan amp. 0,05
Da tales ampullas N ° V (quinque)
S. Ad manum medici.

83. Aluminum hydroxide combined with calcium oxide is an antacid whose effect lasts about 60 minutes. It is used to treat peptic ulcer and reflux esophagitis. One chewable tablet contains 333 mg of aluminum hydroxide and 158 mg of magnesium oxide.

Rp.
Altacid tabl.
Scatulam originalem N ° I (unam)

D.S. Two hours after every meal chew one tablet. Take one more tablet before going to bed if patient isn't better.

84. Aluminum - hydroxide is used to neutralize hydrochloric acid in the stomach and to prevent the absorption of the phosphate in patients with chronic renal insufficiency. The adverse effects are constipation and deposition of the aluminum in bones in patients with chronic renal insufficiency.

Rp.
Aluminii hydroxydi 5,0
Divide in doses aequales N º X (decem)
Da ad chartam ceratam.
S. Stir the powder in a glass of water two hours after each meal and drink it.

85. Betaine – chloride (trimethylglycine hydrochloride) is a substance that releases hydrochloric acid in contact with water. It is used to replace acid in achlorhydria. About 500 mg of this substance releases the amount of HCl contained in 2 ml of officinal HCl solution (10% solution, Acidum chydrochloricum dilutum). Since there is no ready-made preparation, it can be prescribed magisterially:

Rp.
Betaini chloridi 0,5
Da tales doses N º XL (quadraginta)
S. While eating, stir the powder in a glass of water and drink it using the glass tubes. Then rinse yourmouth with water.

86. Medicinal coal (animal coal) is a powder that is obtained by destructive distillation of organic matter. It has a large absorption surface, so it is used for the binding of toxines or poisons that are taken orally. It is given in most cases in poisoning after gastric lavage. If the patient is conscious, he himself drinks the powder that is stirred in a glass of water; if the patient is not conscious, a doctor makes a medical coal suspension in the water and administers it through the nasogastric tube. The usual dose is 50g.

Rp.
Carbonis medicinalis 50.0
Da ad scatulam.
Signa suo nomine. Ad manum medici.

87. Metoclopramide is an antiemetic with a pronounced blocking effect on dopamine receptors in the vomiting center. In addition, it accelerates gastric emptying and reduces gastro-oesophageal reflux. It is used to suppress vomiting after general anesthesia, during a migraine attack and during the administration of cytostatics. The dose is 10 mg i.m. or orally every 8 hours.

Rp.
Klometol amp. 0,01
Da tales ampullas N º X (decem)
S. Ad manum medici.

88. Bisacodyl is a laxative that activates ganglion cells in the colon wall. The effect of bisacodyl starts after 6-12 hours after oral administration and 15-60 minutes after the rectal administration. It is used for the treatment of constipation and for the preparation of colon for surgery or the diagnostic procedures. The usual dose is about 10-30 mg per day.

Rp.
Dulcolax suppositoria 0,01
Scatulam originalem N º I (unam)
D.S. Remove the tinfoil from the suppository, and push it slowly through the anal opening, before going to bed.

VITAMINS

89. Aneurin (thiamine, vitamin B1) is a vitamin necessary for the oxidative decarboxylation of alpha-keto acids. A deficiency of this vitamin causes a disease known as beriberi. In our

conditions, vitamin B1 deficiency occurs only in alcoholics. It is administered orally and parenterally. Daily dose is 30-200 mg.

Rp.
Vitamin B1 Alkaloid amp. 0,1
Da tales ampullas N º XX (viginti)
S. Ad manum medici.

90. Vitamin D (cholecalciferol)

Rp.
Vigantol guttae 10,0 (20000 iu/ml)
Da scatulam originalem N º I (unam)
S. Every day give the child to drink one drop with a little water .

MEDICINES AGAINST HORMONAL DISORDERS

91. Insulin is a peptide hormone of endocrine pancreas that regulates the level of glucose in blood. It is used to treat diabetes. There are several insulin preparations that differ from each other in terms of the duration of action and the latent period until the onset of action. Crystal insulin is one of the short-acting insulins which effect is felt 30-60 minutes after the subcutaneous administration and lasts about 6-8 hours. The dose of insulin depends on the needs of the specific patient and it ranges from a few units to several tens of units per day. A human crystal insulin in a short-acting solution can be proscribed as follows:

Rp.
Actrapid Penfill carpulae 3 ml (100 IU/ml)
Da tales doses N º II (duas)
S. Ad manum medici.

92. Human isophane insulin (medium-long-acting; depot form) in suspension can be prescribed as follows:

Rp.
Insulatard Penfill carpulae 3 ml (100 IJ/ml)
Da talem dosem N º I (unam)

S. Ad manum medici.

93. Methimazole (thiamazole) is a thiourea derivative used to treat hyperthyroidism. It blocks the organization of iodine in the thyroid gland and thereby inhibits the synthesis of thyroid hormones. The most important side effect is leukopenia. In the treatment of hyperthyroidism, it is administered in an oral dose of 15 to 60 mg per day.

Rp.
Tiastat tabl. 0,02
Da scatulam originalem N º I (unam)
S. Take one tablet every day.

94. Progesterone is sex hormone which is synthesized in ovary, adrenal gland and placenta of pregnant women. It is used to treat menstrual disorders, endometriosis, cancer of breasts and endometrium. For treatment of the dysfunctional menstrual bleeding 10mg of progesteron is given i.m. (oil injection) each day for 5 days before the expected menstruation. For treatment of endometriosis and malignant diseases, the depo-preparation of progesteron is usually used and is administered two times a week intermuscularly. Adverse effects of pharmacological doses of progesteron are: increase in appetite, fluid retention, acne, facial skin pigmentation (melasma), depression, gynecomastia, hair loss and menstrual bleeding disorders. Depo-injections of progesteron can be prescribed as ready-made medicine called Progesteron depo®:

Rp.
Progesterone depot amp. 0,25
Da tales ampullas N º II (duas).
S. Ad manum medici.

95. Dexamethasone is a synthetic glucocorticoid that can be used for all indications for which cortisol is also used. Since it does not have a mineralocorticoid effect, it is especially used for the treatment of brain edema and adrenocortical hyperplasia. Dexamethasone can be prescribed as the ready-made drug Dexason® for the treatment of adrenocortical hyperplasia.

Rp.
Dexason tabl. 0,0005
Da scatulam originalem N º I (unam)
S. Take one tablet two times a day.

96. Testosterone is a male sex hormone which is used to treat hypogonadism in men. The adverse effects are masculinization in women, fluid retention, hypercalcemia, priapism, hepatitis (it is more common when using synthetic adrogens with a 17 alpha-alkyl group) Testesterone propionate is given i.m. in a dose of 10-50 mg two to three times a week in the treatment of hypogonadism. A ready-made testosterone depot preparation Testosteron depo® can also be prescribed, which is administered i.m. once every 21 days:

Rp.
Testosterone depot amp. 0,25
Da tales ampullas N º V (quinque).
S. Ad manum medici.

97. Fluocinolon. Fluorinated derivates of corticosteroids (dermatosteroids) are used for local application on the skin. One of them is fluocinolone. Psorasis, keloids, skin manifestations of autoimmune diseases, eczema and others are treated with dermatosteroids.

Rp.
Sinoderm unguentum 15,0
Da tubam originalem N º I (unam)
S. Externally, apply to the affected areas twice a day.

Sinoderm® cream can be used for the treatment of seborrhea, which occurs with seborrhoic dermatitis on hairy regions. The concentration of fluocinolone acetonide in this cream is 0,025%.

Rp.
Sinoderm cremor 15,0
Da tubam originalem N º I (unam)
S. Externally, apply to the affected areas twice a day.

98. Corticosteroids for local application are often combined with antibiotics. For example preparation Hydrocyclin® contains hydrocortisone and oxytetracycline :

Rp.
Hydrocyclin ung. 20,0
Da tubam originalem N º I (unam).
S. Three times a day spread a little oinment on the affected area.

99. Megestrol is synthetic progestogen used to treat breast cancer with progesterone receptors. Female patients take one tablet per day in a dose of 160mg for two months at least, so that the effect could be manifested. It leads to worsening of diabetes, and can cause thrombophlebitis.

Rp.
Megace tabl. 0,16
Da scatulam originalem N º I (unam)
S. Take one tablet a day.

100. Estrogens are used to treat postmenopausal osteoporosis, dysfunctional uterine bleeding, cancer of breast and prostate, as well as the contraception. Estradiol is quickly metabolized in the body, so it should be administered in some form of depot preparation. Esters of estradiol are used in the form of intramuscular depot injections that gradually release estradiol; some can be given only once a month (cypionate, valerate) and some twice a week (dipropionate). Another way of continuous administration of estradiol is through transdermal patches, which are stuck to the skin once a week.

Rp.
Climara emplastra transcutanea 50 mcg/24h
O.p. N º I (unam)
S. Once a week stick one plaster on the skin above hips.

101. Hormone replacement during menopause has more positive effects on the woman's body, as it delays the development of osteoporosis, eliminates menopausal symptoms, reduces the risk of atherosclerosis complications and slows down the involution of the sexual organs and skin. Unwanted actions of the hormone replacement in menopause are: thromboembolic complications, amenorrhea, depression, retention of water, benign tumors of liver, headache, sensitivity of breasts and other. Cyclo-Progynova ® preparation contains

norgestrel 0.5 mg and estradiol valerate 2 mg. One dragee is taken a day during the 21st day, and then there is a seven-day break.

Rp.
Cyclo-Progynova drag.
Scatulam originalem N º I (unam)
D.S. Take one dragee a day for 21 days, then take a break for 7 days.

102. Dapagliflozin is an oral antidiabetic drug that blocks the reabsorption of glucose in the renal tubules and thus leads to a drop in glycemia. It is used to treat insulin-dependent diabetes (type II). Side effects are increased frequency of urinary infections (due to glucose in the urine), polyuria and back pain.

Rp.
Forxiga tabl. 0,01
Scatulam originalem N º I (unam)
D.S. Take one tablet a day .

103. Gliclazid is a newer generation oral hypoglycemic-antidiabetic drug with few side effects, so it is suitable for elderly patients with non-insulin-dependent type of diabetes mellitus.

Rp.
Diprian tabl. 0.08
Da scatulam originalem N º I (unam).
S. One tablet in the morning before breakfast.

ANTIMICROBIAL DRUGS

104. Phenoxymethylpenicillin (penicillin V) is a naturally occurring penicillin administered orally. It acts on gram-positive bacteria (B. anthracis, Cl. perfringens, Cl. tetani, Corynebacterium diphteriae, Erysipelothrix rhusiopathiae, Listeria monocytogenes, Peptostreptococcus spp, Streptococcus /agalactiae, pneumoniae, pyogenes and some viridans/, Staphylococcus that does not produce beta-lactamase), gram-negative bacteria (Meningococcus, Gonococci, Pasteurella multocida, Streptobacillus moniliformis, Spyrillum minus, Bacteroides /but not fragilis/, Fusobacterium), actinomycetes and spirochetes (borrelia, leptospira and treponema). The dose for children between 1 and 5 years old is 200,000 IU

every 6 hours. Now it is not registered in Serbia, but it was previously marketed under the name Cliacil® (300000 IJ/5 ml).

Rp.
Cliacil sirupus 150 ml
Da lagenam originalem N º I (unam)
S. Give the child one small spoonful of syrup every eight hours.

105. Benzylpenicillin is a natural substance that has a bactericidal effect. The spectrum of action is the same as that of phenoxymethylpenicillin. It is administered only parenterally because hydrochloric acid in the stomach breaks it down. Benzylpenicillin ("crystalline penicillin") is administered mainly intravenously for the treatment of septic complications of bacterial infections. The usual dose is 1000000 IU i.v. every 3 hours (this short interval between doses is due to the rapid elimination of benzylpenicillin). The preparation Penicillin G® (which is currently not registered in Serbia, but is imported for individual patients, when there is no alternative therapy) in one bottle contains 1000000 IJ potassium salt of benzylpenicillin in a lyophilized state. As benzylpenicillin is labile in aqueous solution, the contents of the vial should be dissolved immediately before administration with sterile distilled water.

Rp.
Penicillin G lagenae 1,000,000 IJ
Da tales doses N º XXI (viginti unam)
S. Ad manum medici.
#
Rp.
Aqua pro injectione 10,0
Da tales ampullas N º XXI (viginti unam)
S. Ad manum medici.

106. Depot penicillins. Due to its rapid elimination from the body (by tubular secretion in kidneys), penicillin is also prepared in the form of depot preparation for intramuscular administration, which gradually release it into the circulation. Such depot preparation can not be administered more than once or twice a day. The mixture of procaine-penicillin (3 parts) and benzylpenicillin (1 part) is most often used and is called bipenicillin. For the treatment of syphilis 1600000 IJ of this mixture is applied daily i.m. during 20 days. For the treatment of

streptococcal tonsililitis 80000 IJ of bipenicillin should be given daily i.m. for 10 days. In the treatment of pneumococcal pneumonia higher doses of bipenicillin should be given: 1600000 IJ for 12 hours i.m. for 2 weeks. Today the natural penicillin is unfairly avoided in the therapy. Therefore, there is not a single preparation of bipenicillin that is registered in Serbia. Jugocillin® (Galenika) was very cheap and very effective preparation of bipenicillin, which 800000 IJ contained 600000 IJ of procaine-penicillin and 200000 IJ of benzylpenicilin.

Rp.
Jugocillin lagenae 800000 IJ
Da tales doses N º XX (viginti)
S. Ad manum medici.

#

Rp.
Aqua pro injectione 2.0
Da tales ampullas N º XX (viginti)
S. Ad manum medici.

107. Ampicillin is a semi-synthetic penicillin with an extended spectrum of action. It acts on the same gram-positive bacteria as benzylpenicillin, only slightly weaker. In addition, Moraxella catarrhalis, gonococcus, meningococcus, Hemophilus influenzae, E. coli, Proteus mirabilis, Salmonella, Shigella, many anaerobes and actinomycetes are sensitive to ampicillin. The dose of ampicillin is 0.25-1 g every 6 hours, at least 30 minutes before or 2 hours after eating.

Rp.
Pentrexyl caps. 0.5
Scatulam originalem N º I (unam)
D.S. Take one capsule every 6 hours, 2 hours after eating.

108. Cloxacillin is a semi-synthetic penicillin that is resistant to the action of penicillinase. It is only used to treat infections with penicillinase-secreting staphylococci. It is not used to treat infections caused by gram-positive bacteria that are sensitive to benzylpenicillin because it is less effective than it. Cloxacillin®, which is unfortunately not registered in our country, can be prescribed:

Rp.
Cloxacillin caps. 0,25

Scatulam originalem N º I (unam)
S. Every 6 hours take 2 capsules for 30 minutes before meal.

109. Cephalexin is a cephalosporin antibiotic from the first generation that is applied orally. It acts on all gram-positive bacteria from the group of bacteria the penicillin acts on, but less so. It is active against staphylococci that produce penicillinase, but not against those that are resistant to methicillin. E. coli, Klebsiella pneumoniae, Proteus (but not indole-positive), Salmonella and Shigella are sensitive to cephalexin.

Rp.
Palitrex caps. 0.5
Scatulam originalem N º I (unam)
D.S. Take one tablet every 6 hours.

110. Cefotaxime is a third generation cephalosporin antibiotic that is used only parentally. It acts on gram-positive bacteria with less effectiveness than cephalosporin of the first generation, but it has an extended spectrum of action in the field of gram-negative bacteria. E. coli, Proteus (and indole-positive), Citrobacter, Klebsiella, Providencia, Shigella, Salmonella, Serratia, Yersinia, Haemophilus, Moraxella catarrhalis, Neisseriae meningitidis et gonorrhoeae, Brucella melitensis are sensitive to it. It is used to treat the severe infections of the abdomen and small pelvis that are the complications of surgical interventions. The dose of cefotaxime is 2-6 g daily i.m. or i.v. devided into 2 or 3 doses.

Rp.
Cefotaxim-MIP lagenae 1.0
Da tales doses N º XX (viginti)
S. Ad manum medici.
#
Rp.
Aqua pro injectione 10.0
Da tales ampullas N º XX (viginti)
S. Ad manum medici.

111. Ceftriaxone is a third generation cephalosporin antibiotic that is applied parenterally. Spectrum of its action is similar to the one of cefotaxim, so their use are similar as well. It penetrates successfully in the central nervous system and has a long elimination half-life (6-8 hours), so it can be administered just once a day in the form of

intramuscular or intravenous 1g injection. Lidocaine local anaesthetic solution must not be used as a solvent in the case of the intravenous administration, which can otherwise be used for intramuscular administration (when the reduction of local pain is in question). In the therapy of gonorrhea it is given in a single dose of 2g.

Rp.
Longacef lagenae 1,0
Da tales doses N º XX (viginti)
S. Ad manum medici.

#

Rp.
Aqua pro injectione ampullae 10,0
Da tales ampullas N º XX (viginti)
S. Ad manum medici.

112. Ciprofloxacin is a substance from the group of fluoroquinolones with a broad spectrum of activity that includes gram-negative and gram-positive bacteria. However, it is not effective against anaerobic bacteria! Its use is contraindicated in persons under the age of 17, pregnant women and those suffering from epilepsy. It is used in treatment of uncomplicated gonorrhea (instead of ceftriaxone) in a single oral dose of 500mg. For the treatment of the bacillary dysentery, 500mg of ciprofloxacin is administered two times a week for 7 days.

Rp.
Cyprocinal tabl. 0,5
Scatulam originalem N º I (unam)
D.S. Two times daily take one tablet .

113. Gentamicin is an aminoglycoside antibiotic that acts mainly on gram-negative bacteria. From gram-positive bacteria, it acts on staphylococcus, while it acts on streptococcus and enterococcus only when used together with beta-lactam antibiotics. Adverse effects are kidney damage, hearing damage and potentiation of neuromuscular blockade. It is administered only parenterally. The dose is 3-5 mg/kg per day, divided into three parts.

Rp.
Gentamicin amp. 0,08
Da tales doses N º XX (viginti)
S. Ad manum medici.

114. Streptomycin is an aminoglycoside antibiotic that has a similar spectrum of action as gentamicin, but unlike it, it has a stronger effect on the causative agents of tuberculosis, plague, tularemia and brucellosis. It is used mainly for the treatment of tuberculosis, plague, tularemia and brucellosis (together with tetracyclines), and at one time (before the advent of glycopeptides, cephalosporins and carbapenems) it was also used in the treatment of streptococcal endocarditis lenta (together with penicillin). The dose for the treatment of tuberculosis is 15-20 mg/kg per day. It is not registered in Serbia, so it must be imported, for individual patients, according to a special procedure.

Rp.
Streptomycin sulfas lagenae 1,0
Da tales doses N º XX (viginti)
S. Ad manum medici.
#
Rp.
Aqua pro injectione ampullae 10,0
Da tales ampullas N º XX (viginti)
S. Ad manum medici.

115. Isoniazid is isonicotinic acid hydrazide used to treat tuberculosis. It penetrates well into all tissues. Because of its chemical similarity to vitamin B6, it acts as its antagonist, so this vitamin must be supplemented (10 mg per day) during isoniazid therapy in people with a potential deficiency (diabetics, pregnant women, alcoholics, patients with uremia). Adverse effects include liver damage, peripheral neuritis, psychotic reactions and convulsions. The daily dose of isoniazid is 5 mg/kg per day, as a single oral dose before meals. It is not registered in our country.

Rp.
Isoniazid tabl. 0.05
Scatulas originales No. III (tres)
D.S. In the morning before breakfast take 6 tablets at once.

116. Rifampicin is a broad-spectrum antibiotic to which resistance develops extremely quickly. That is why it is always used in combination with other antibiotics. It is used for the treatment of tuberculosis, leprosy, staphylococcal infections, brucellosis, Legionnaires' disease and in the prophylaxis of meningitis caused by hemophilus or meningococcus. The most important side effects are flu-like syndrome and liver damage. The dose of rifampicin is 10 mg/kg of body weight (maximum 600 mg) per day, in one oral dose before meals.

Rp.
Rifamor caps. 0,3
Scatulam originalem N ^{o} I (unam)
D.S. Take two capsules in the morning before meals.

117. Tetracycline is a broad-spectrum bacteriostatic antibiotic. It acts on many gram-negative and gram-positive bacteria, on chlamydiae, rickettsiae, mycoplasmae, amoebae and the causative agents of malaria. It must not be given to pregnant women and children under the age of 12 because it is deposited in the teeth and bones. The dose of tetracycline is 250-500 mg every 6 hours, orally. The drug must be taken before meals because it binds to food ingredients (especially calcium from milk) that interfere with absorption. It is excreted through the kidneys.

Rp.
Amracin caps. 0,5
Scatulam originalem N ^{o} I (unam)
D.S. Take one capsule 4 times a day before meal.

118. Doxycycline is a tetracycline antibiotic that is given only once a day. Unlike most other tetracyclines, it is eliminated through the bile, as is minocycline.

Rp.
Dovicin caps. 0,1
Scatulam originalem N^{o} I (unam)
D. S.Take one tablet twice on the first day, and then one tablet a day.

119. Chloramphenicol is an antibiotic which works against both gram-positive and gram-negative bacteria. Very often, it is used as antibiotic for the local application in dermatology and ophthalmology.

For the correct application of the oinment in the eye it is necessary to train the patient.

Rp.
Chloramphenicol unguentum 5,0 (1%)
Tubam originalem N^{o} I (unam)
D. S. Pull the lower eyelid three times a day and squeeze out a little oinment to the conjunctiva (from the inside to the outside).

120. Erythromycin is a macrolide bacteriostatic antibiotic. It is used to treat diphtheria, pertussis, Legionnaire's disease and as a substitute for penicillin in patients alergic to penicillin. It can also be used to treat chlamydial diseases if tetracyclines are ineffective. Because it acts as an agonist at motilin receptors, erythromycin causes gastrointestinal complaints. In addition, it is sometimes hepatotoxic and transiently ototoxic. The usual oral dose for adults is 1-2 g per day, divided into several doses. The oral dose for children aged 2 to 8 years is 0.5 to 1 g per day.

Rp.
Erythromycin HF tabl. 0.5
Scatulam originalem N ^{o} I (unam)
D.S. Take one tablet every 6 hours

121. Co – trimoxazole. In the penultimate edition of the Yugoslav pharmacopoeia (fourth), there are no preparations with a combination of several sulfonamides; nor is a ready-made medicine with such a combination registered. Only the combination of the sulfonamide sulfamethoxazole with the antibacterial agent trimethoprim (an inhibitor of dihydrofolate reductase) can be prescribed. This combination is known as co-trimoxazole. The ingredients act synergistically against most gram-positive and gram-negative bacteria (especially salmonella, shigella, yersinia), against the protozoa Pneumocystis carinii and some atypical bacteria (nocardiosis, melioidosis, blastocystosis). The finished preparation Bactrim® in one tablet contains 400 mg of sulfamethoxazole and 80 mg of trimethoprim and is used orally, twice a day for two tablets.

Rp.
Bactrim tablettae
Scatulam originalem N ^{o} I (unam)
D.S. Take two tablets twice a day.

122. Nystatin is an antifungal antibiotic intended for the local treatment of candidiasis (moniliasis). It has a fungicidal effect. It cannot be administered parenterally because it is highly toxic to the kidneys. It can be used to treat oral candidiasis in infants (thrush) because it is not absorbed at all from the digestive tract:

Rp.
Nystatin gtt. 24 ml (100000 IU/ml)
Scatulam originalem N º I (unam)
D.S. Give the child 15 drops of the suspension four times a day on the tongue. Shake before use!

123. Terbinafine is an antifungal drug that is effective against skin and nail infections caused by Trichophyton species (T.rubrum, T.mentagrophytes, T.verrucosum, T. violaceum), Microsporum canis and Epidermophyton floccosum. The mechanism of action is the inhibition of the early stages of ergosterol synthesis, due to which the fungal membrane loses its integrity. It is given locally for minor infections, and systemically, if the changes are widespread.

Rp.
Lamisil tabl. 0,25
Da scatulam originalem N º I (unam)
S. Take one tablet a day.

124. Ketoconazole belongs to a group of highly efficient antimycotics that are chemically imidazoles (azoles). There are numerous preparations of this drug for the local treatment of mycosis, but still the only one that is registered in our country is a hair shampoo ketoconazole. This shampoo is used to prevent and treat a dandruff in seborrheic dermatitis on the scalp:

Rp.
Mycoseb emulsion 100 ml (20 mg/g)
O.p. Nº I (unam)
D.S. Wash your hair with this shampoo every 3-4 days for 2-4 weeks.

125. Metronidazole is a 5-nitroimidazole that acts against anaerobic bacteria (Bacteroides, Clostridium) and protozoa (Balantidium coli, Entamoeba histolytica, Giardia lamblia, trichomonas vaginalis). It also acts on facultative

anaerobes Gardnerella vaginalis (responsible for leukorrhea in women) and Helicobacter pylori. A side effect is peripheral neuropathy. The oral dose for trichomoniasis treatment is 400 mg of metronidazole twice a day for 7 days. The oral dose for the treatment of amebic dysentery is 400 mg three times a day for 10 days. However, today metronidazole is mostly used to treat infections in the abdomen and pelvis, as well as for post-antibiotic diarrhea caused by Clostridium difficile toxins.

Rp.
Orvagil tabl. 0,4
Scatulam originalem N º I (unam)
D.S. Take one tablet twice a day.

126. Fusidic acid is an antibiotic effective against staphylococci, nocardia, meningococci, gonococci, bacteroides and the causative agent of falciparum malaria. It is mainly used to treat staphylococcal infections, either systemically or locally. May cause jaundice. The ready-made preparation Stanicid® is not registered in Serbia, but it can be obtained from other countries for individual patients who need it:

Rp.
Stanicid drag. 0,25
Scatulam originalem Nº I (unam)
D. S. Take one dragee three times a day.

127. Norfloxacin is a quinolone preparation that inhibits DNA gyrase, an enzyme necessary for the formation of the superstructure of the bacterial chromosome. It has the same spectrum of action in vitro as ciprofloxacin (see earlier), but it cannot be used to treat systemic infections because it does not reach a bactericidal concentration in tissues. It is only used to treat urinary infections because it concentrates in the urine. It has the same side effects as ciprofloxacin.

Rp.
Nolicin tabl. 0,4
Scatulam originalem N º I (unam)
D.S. Take one tablet twice a day for 7 days.

ANTISEPTICS AND DISINFECTANTS

128. Hydrogen peroxide (" hydrogen ") is an antiseptic that oxidizes the structural molecules of microorganisms. It is used in a concentration of 0.3-3% for rinsing wounds, sinuses and the oral cavity. A 3% hydrogen peroxide solution can be prescribed intravenously:

Rp.
Hydrogenii peroxydi solutionis concentratae 10.0
Aquae purificatae ad 100.0
Misce fiat solutio.
Da ad vitrum.
S. Externally, dilute one large spoonful of the preparation with a glass of water and rinse your mouth with the resulting solution.

129. Cresol. One of the disinfectant solutions is cresol soap solution, which we can prescribe:

Rp.
Tricresoli 50.0
Kalii saponis 50.0
Misce fiat solutio.
Da ad vitrum.
S. Externally, stir one teaspoon of the solution in a glass of water. It is possible to disinfect the skin of the hands with a diluted solution*.

* This solution of cresol contains per 100 ml 50 g tricresol and 50 g of potassium soap. Medium therapeutic concentration is 1%. One teaspoon takes 5 ml , therefore contains 2.5 g of tricresol . When 2.5 g tricresol is dissolved in a glass of water (200 ml), one gets diluted solution with approximate concentration of 1%.

130. Boric acid is a mild antiseptic that is used in a concentration of 3% for washing the eyes, for cleaning the skin and for making poultices for wet eczema. Boric acid solution must be prescribed magisterially:

Rp.
Acidi borisi 3.0
Aquae purificatae ad 100.0
Misce fiat solutio.
Da ad vitrum.
S. On the outside, apply clean gauze soaked in the solution to the diseased place several times a day.

131. Mebendazole is a benzimidazole that is practically not absorbed from the digestive tract. It is used to treat infestations with ascaris, enterobius, hookworm, Necator americanus and trichiura. It interferes with glucose utilization in parasites. In large doses, it can lead to liver and bone marrow damage and alopecia. For the treatment of enterobiasis, only one dose of 100 mg is given. The same dose is usually repeated in two to three weeks. For the treatment of ascariasis, 100 mg is given twice a day for three days.

Rp.
Soltrik suspensio 30 ml (100 mg/5 ml)
Scatulam originalem N º I (unam)
D. S. Drink only one teaspoon with plenty of water.

132. Niclosamide is a medicine against taeniasis. It is not absorbed from the digestive tract. It acts on Tenia saginata, Tenia solium, Diphylobotrium latum and Hymenolepis nana. It interferes with oxidative phosphorylation and anaerobic ATP generation in tapeworms. Since the drug does not destroy the eggs and larvae, it is possible that during administration, regurgitation of tapeworm articles into the stomach, release and penetration of the larvae through the stomach wall (cysticercosis occurs).
The risk of cysticercosis is high only with T.solium. To prevent this, a laxative should be given two hours after taking niclosamide (for example, 15 g of magnesium sulfate with plenty of water). A single dose of 2 g of niclosamide is given after a light breakfast for the treatment of swine tapeworm. Niclosamide is not registered in our country.

Rp.
Yomesan tabl. 0,5
Scatulam originalem N º I (unam)
DS After a light breakfast, chew and swallow 4 tablets with very little water. Two hours after, stir 15g of magnesium sulfate in two glasses of water and drink it.

UTEROTONICS AND TOCOLYTICS

133. Oxytocin is a peptide hormone of the posterior lobe of the pituitary gland. It causes rhythmic contractions of the uterus and

enchances spontaneous contractions. It is used to induce late labor, to stimulate slow labor and to stimulate milk ejection during breastfeeding. The effect of oxytocin lasts for a short time, so it must be given by intravenous infusion.

Rp.

Oxytocin synthetic amp. 10 IJ
Da tales ampullas N º X (decem)
S. Ad manum medici.

134. Methylergometrine is a semi-synthetic derivative of the alkaloid ergometrine from ryegrass (a fungus that parasitizes rye), which leads to tetanic contraction of the uterus. It is used after the expulsion of the fetus and placenta, in the fourth stage of labor, in order to reduce blood loss and accelerate the involution of the uterus. A dose of 0.2 mg methylergometrine is given i.m. or i.v. Its use while the fetus is in the uterus is contraindicated!

Rp.
Methyl ergometrine amp. 0.0002
Da tales ampullas N º III (tres)
S. Ad manum medici.

135. Nifedipine is a calcium channel blocker that causes relaxation of the smooth muscles of the uterus (tocolytic). It is used to prevent premature birth. It can be given orally, in the first hour up to 40 mg, then 20 mg every 6-8 hours. Therapy is applied only for 2-3 days.

Rp.
Nifelat tabl. 0.02
Scatulam originalem N º I (unam)
D.S. In the first hour take two tablets, then one tablet every 6 hours.

DERMATOLOGICAL PREPARATIONS

136. Camphor is a substance that is obtained by the dried trunk, branches and leaves of the camphor tree (Cinnamomum camphora). When applied to the skin (which must be uninjured), it

irritates the endings of nerve fibers and leads to hyperemia (redness; Latin rubefacio = to blush) with an axon reflex. It is used as an auxiliary tool in the treatment of chronic rheumatism – it gives a feeling of warmth and facilitates movements in the joint above which it is applied. The camphor solution in ethanol can be made (10%):

Rp.
Camphorae 10.0
Ethanoli concentrati 70.0
Aquae purificatae 20.0
Misce fiat solutio.
Da ad vitrum.
S. Externally, rub a little of the solution into the skin above stiff joints.

137. Keratoliythics are preparations that soften keratin deposits on the skin because they break the covalent bonds in keratin. They are used to remove keratin deposits in diseases that are accompanied by excessive keratinization (callus, ichthyosis, psoriasis). In addition, they can be used to treat saprophytic fungi that parasitize the skin (pityriasis). Salicylic acid must be prescribed intravenously:

Rp.
Acidi salicylici 5.0
Vaselini albi ad 50.0
Misce fiat unguentum.
Da ad scatulum.
S. Externally, apply to the affected areas twice a day.

138. Tretinoin is a derivative of vitamin A (ol-trans retinoic acid) used to induce remission in acute promyelocytic leukemia. Patients take 45 mg/m2 of tretinoin per day, until remission is achieved, and for a maximum of 90 days. In some patients, it can cause "Retinoic acid syndrome": fever, dyspnea, pulmonary infiltrates, pleural and pericardial effusions, hypotension, edema, weight gain, liver and kidney failure.

Rp.
Vesanoid caps. 0,01
Scatulam originalem N ^{o} I (unam)
D. S. Take 8 capsules once a day.

139. Resorcinol is a dihydroxy derivative of benzene. It has keratolythic and antiseptic properties. It is used to treat acne and seborrheic dermatitis. The effective concentration ranges between 2% (antiseptic) and 20% (keratolythic). It is sensitive to light, so it must be stored in a dark place. A topical ointment can be prescribed for the treatment of seborrhea with resorcinol:

Rp.
Resorcinoli 1.0
Vaselini albi ad 50.0
Misce fiat unguentum.
Da ad scatulum.
S. Externally, apply to the affected areas twice a day.

Appendix 1 .
BASIC NUMBERS ON THE IN LATIN LANGUAGE

ROMAN NUMBER	LATIN NAME	ROMAN NUMBER	LATIN NAME
I	unus, una, unum	XVII	septendecim
II	duo, duae, duo	XVIII	duodeviginti
III	tres, tria	XIX	undeviginti
IV	quattuor	XX	Viginti
V	quinque	XXI	viginti unus
YOU	sex	XXII	viginti duo
VII	Septem	XXVIII	duodetriginta
VIII	Octo	XXIX	undetriginta
IX	novem	XXX	triginta
X	Decem	XL	quadraginta
XI	undecim	L	quinquaginta
XII	duodecim	LX	sexaginta
XIII	tredecim	LXX	Septuaginta
XIV	quattuordecim	LXXX	octoginta
XV	quindecim	XC	nonaginta
XVI	sedecim	C	centum

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