



THE DOSAGE FORM IS "GEL". THE HISTORY OF THE ORIGIN AND CLASSIFICATION OF GELS

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Annotation. The review examines the history of the origin, as well as the prospects for the use of the dosage form – gel, the advantages and disadvantages of this dosage form, classification by place of use and destination.

The purpose of this work is to conduct comprehensive research on the creation of a new dosage form – a gel with anti-inflammatory, wound-healing, antiviral effects, as well as substantiation of the composition, technology of gel production, methods of analysis and study of bioavailability.

Keywords: gel, skin, history of occurrence, classification of gels, antibacterial effect, anti-inflammatory property.

The history of the technology of dosage forms

In the Ancient World, medicinal forms appeared, in other words, the beginnings of drug technology. In particular, in ancient Egypt (where papyri were found), medicines were prepared and applied by pronouncing spells and performing certain rituals. Thus, the Georg Ebers papyrus (named after the scientist studying it, found in 1860 in Teben, published in 1875) contains more than 900 prescriptions of medicines published in 22 volumes. In this papyrus there are recommendations for their manufacture and reception: medicines are taken with an appeal and a spell to the god of medicine Theta (Totu). [1]

During the excavations of the city of Nippur, cuneiform texts on clay tablets were also found, which are a reference book containing a list of medicines and information about their preparation. It was the oldest "pharmacopoeia" written in the Sumerian language (about 5 thousand years BC). The oldest "pharmacopoeia" of the world also includes the "Treatise on Roots and Herbs" (author Shen-Nong) (no earlier than the XI and no later than the V century BC), which includes a description 365 medicinal plants and the technology of preparation of dosage forms (230 medicinal plants, 65 products of animal origin, 48 – mineral, 28 – auxiliary substances). He also compiled classifications of plants according to their pharmacological properties. In 502, one of the first known in the world, the Chinese pharmacopoeia was created in seven books, which describes 730 species of medicinal plants. In institutions called pharmacies in the modern lexicon, various medicines were prepared in ancient China according to certain technologies.

The technology of medicinal forms reached especially great heights in ancient Greece. However, Hippocrates (460-377 BC) used only 236 medicines, and used plant raw materials without processing, considering that in its natural state it has the best therapeutic effect. However, in ancient Greece there was a profession of rhizotomes ("root cutters") – collectors and processors of medicinal raw materials. From rhizotomes, "rhizotomics" have been preserved - essays on plants, methods of grinding them and preparing medicines. The representative of the rhizotomes was Kratevas, to whom Hippocrates addressed in a letter with a request to send him herbs and vegetable juices that may be useful for the treatment of Democritus. [2]

Liquid dosage forms were prepared in the form of solutions, potions, decoctions. They were used internally and externally. Ointments and pastes were prepared in this way: they were boiled in oil, and then the solid parts were rubbed and evaporated, the dry leaves (fruits, flowers) of medicinal herbs were rubbed with honey. In addition, ointments were prepared on a fat basis, more often on fat from sheep wool - lanolin. The oils were prepared by squeezing them out of almonds, olives, nuts, sesame. Sesame oil was especially often used in ancient Iran. Essential oils were extracted from flowers and fruits by extraction with nut or, most often, olive oil.[3]

In the Middle Ages, devices and apparatuses from the laboratory of alchemists were widely used in pharmacies. The first pharmacy was opened in 754 in Baghdad. And since Arab alchemists by that time had already invented a water bath, an alembic, described the operations of melting, distillation, coagulation, dissolution, digestion, etc., and also obtained nitric and sulfuric acids, ethanol, bleach, then all this began to be used in pharmacies. So the Persian scientist Abu Mansur al Harawi Muwaffat in 975 for the first time described the use of distilled water for pharmaceutical purposes. He also described 466 herbal and 44 animal medicines, and also pointed out the technology of their preparation. Ibn alTalmid (the author of the best pharmacopoeia at that time) collected more than 20 thousand ways of drug technology. Abu Ali ibn Sina (Avicenna) (circa 980-1037), the author of the work "The Canon of Medical Science", described 900 medicines and methods of drug technology in its fifth volume.

Dosage form "gel"

Gel — gelum, i n; (gel from lat. gelu, us n frost, frost, ice), is a mild dosage form for topical use. According to its biopharmaceutical characteristics, the gel is close to ointments and creams, but has its own number of differences from previous dosage forms. According to the data of physcolloid chemistry, a gel is an aqueous solution of high—molecular substances in a cohesive state. [4]

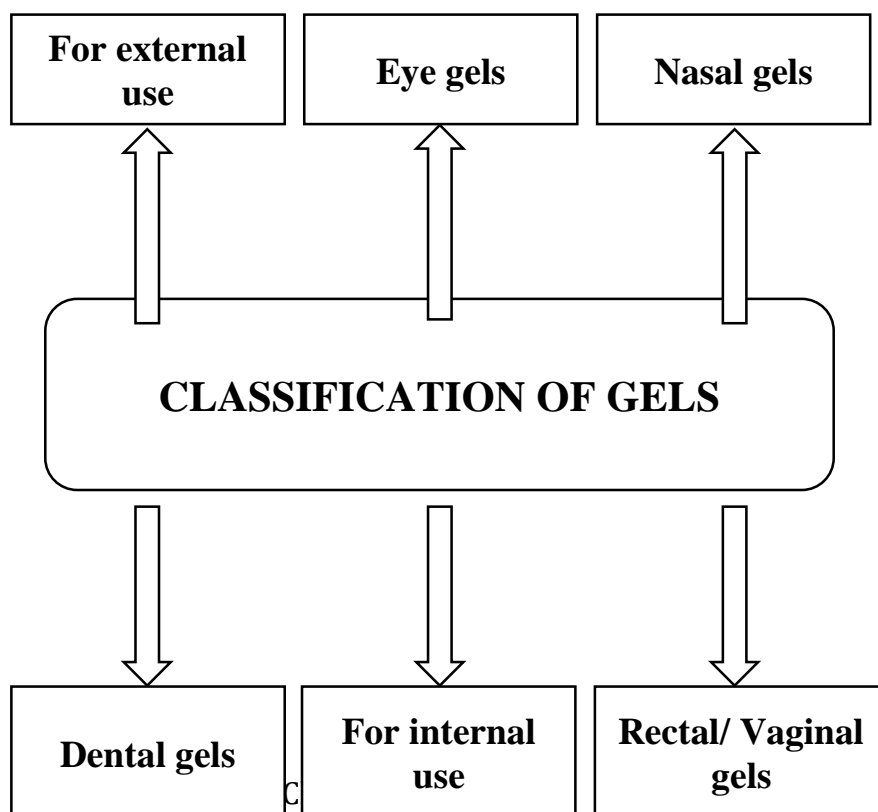
The predominant property of gels used as bases for ointments is their hydrophilic nature, which allows the use of gels for the relief of biologically active substances that exhibit their specific pharmacological properties exclusively in an aqueous environment. The use of gels for the local treatment of wounds has established advantages in contrast to other medicinal forms: this is a long-term therapeutic effect, high bioavailability, which is part of the gel of medicinal substances, as well as the possibility of local exposure. Gels are convenient and easy to use, as they absorb skin excretory products well, have the growth of granulation tissue, do not stain clothes and quickly form a thin protective film on the skin surface [5].

The use of modern gels creates an optimal microenvironment for the processes of reparative tissue regeneration [6]. One of the promising methods of enhancing the therapeutic effect of gels in providing medical care to the burned is the inclusion in their composition of salts with anti-inflammatory and antiseptic effects (bactericidal effect against a wide range of microorganisms, fungi, viruses) [7].

Unlike ointments, gels are a very promising dosage form, since they have a pH close to the pH of the skin, are quickly manufactured, do not clog the pores of the skin, are quickly and evenly distributed and absorbed, and hydrophilic medicinal substances can be introduced into gels and suspension gels can also be made (for example, gel with sulfur). Also, gels do not freeze in cold weather and do not melt in the sun; they do not get wet. The advantage of gels is their minimal toxicity, the possibility of long-term use without significant side effects and the versatility of pharmacological properties, which makes it possible to safely act simultaneously on many body systems. A complex complex of substances dosed in gels has a beneficial effect on the body as a whole.

Advantages of the dosage form “gel”	Disadvantages of the dosage form “gel”
- prolonged action;	- not all medicinal substances can be introduced into the composition of gels;
- the ability to apply at night;	- possibility of delamination during storage;
- the presence of a moisturizing effect, forming a protective film on the mucous membrane, which contributes to the speedy healing of wounds and burns;	- Pronounced systemic action, which is not always desirable;
- beneficial effect on the mucous membrane when it is dry, the presence of crusts;	- applied to wet, soaking surfaces where gels bond well;
- in contact with skin or clothing, the gel is easily washed off with water, leaving no traces (unlike ointments)	- can not be applied to areas with wounds, cracks, erosions and open ulcers [8]

Table №1. Advantages and disadvantages of the gel dosage form



Gels for external use (gela ad usum externum). Gels for external use are applied to pre-cleaned affected areas of the skin with a thin layer following the instructions. When applying the gel topically, the interaction with other drugs is insignificant, but caution should be exercised when prescribing with other drugs at the same time.



Basically, all the well-known gels for external use, such as Metrogil, Diclofenac, Naiz, Voltaren, Lyoton and other gels, have analgesic, anti-inflammatory, antimicrobial effects, and thanks to this dosage form, contribute to the rapid manifestation of the therapeutic effect.

Eye gels (gela ophthalmica) are mild dosage forms containing one or more active substances dissolved or dispersed in a suitable base, intended, as a rule, for application to the conjunctiva. Eye gels can also be applied to the eyelids and cornea.

There are various eye gels that have proven their effectiveness in the treatment of eye diseases, which are still widely used in ophthalmology. These are such drugs as Korneregel, Oftagel, Sistein gel, Solcoseryl and others.

Nasal gels (gela nasalialia) this dosage form is used in case of dryness of the nasal mucosa, in the presence of crusts, with the consequences of a nasal injury, as well as to prevent nasal congestion, such as Vibrocil gel.

Dental gels (gela stomatologica) – gel allows you to combine the properties of a solid and a liquid. As a solid, the gel has a shape, a certain consistency and has the ability to linger on the teeth and tissues of the oral cavity. At the same time, as in a liquid, there is a process of diffusion (propagation), as a result of which gels are effective for the application of various components. Widely known in the pharmaceutical market dental gels: Metrogil Denta, Solcoseryl Denta, Kalgel, Dentamete and others.

Gels for internal use (gela ad usum internum). This dosage form helps to restore the disturbed intestinal microflora and does not affect its motor function. For example, you can imagine Enterogel, which is taken orally 1-2 hours before or after eating or taking other medications, washed down with water. It is recommended to stir the required amount of the drug in a glass in a triple volume of water at room temperature or take it orally with water.

Rectal gels (gela rectalia) are used for local treatment - hemorrhoids, inflammatory diseases of the rectum and sigmoid colon, prostate, rectal cracks; providing a laxative effect, as well as for the introduction into the body and systemic effects: vitamins, immunomodulators, nonsteroidal anti-inflammatory drugs, analgesics and sleeping pills, antihistamines, cardiovascular and antispasmodic agents, antibacterial and other medicines. Such medicinal forms include Relifipin and its analogues.

Vaginal gels (gela vaginalia). These gels are used for the treatment of various vaginal diseases, such as bacterial vaginosis of various etiologies, confirmed by clinical and microbiological data; urogenital trichomoniasis. Widely known drugs: Mntrogil, Candide, Lactagel and others.

References:

1. Истоки развития фармации и фармакологии/ Эльяшевич Е.Г. и соавт - Бел. мед. журн.-2002. - №1.-С.118-119.
2. Ковнер С. Очерки медицины: Вып.2: Гиппократ, Киев, 1983. - С.1-2,С.378
3. Зеликсон Ю.И., Кондратьева, Т.С. Изготовление лекарств в Древней Греции// Фармация. - Т.3, №4. – 1987. - С. 83-85.
4. Дворецкий И.Х. Латинско-русский словарь. М., 1986.
5. Лекарственные препараты в России. Vidal, М., 2001.
6. Blackwood K.A., McKean R., Canton I., Freeman C.O., Franklin K.L., Cole D. Development of biodegradable electrospun scaffolds for dermal replacement // Biomaterials. 2008. V.29. P.3091-3104.
7. Elliott C. The effects of silver sulfadiazine on chronic and burns wound healing // Br. J. Nurs. 2010. V.19. №15. P.32-36.

8. https://provizor24.ru/blog/myagkie_lekarstvennye_formy

