

УДК 616.31-022-08:615.242:615.454.1.001.5

N.V. KAMASHEVA, G.O. USTENOVA, R.O. OMAROVA, B.A. DOSZHANOVA, I.V. BARATOVA

Kazakh National medical university named after S.D. Asfendiyarov, Almaty c.

DEVELOPMENT OF DENTAL GEL ON BASIS OF NANOCONTAINERS FOR THE TREATMENT OF VIRAL DISEASES



Kamasheva N.V.

In classical pharmacy and pharmacology treatment of any disease is carried out by receiving the traditional dosage forms as tablets, injection solutions, ointments, and others. As a result, the medicine falls into all cells of the body. All this leads to a different kind of pathology. The most of promising development in the field of pharmacology and pharmaceuticals is the creation of new mean of drug delivery. Nanocontainers used for targeted drug delivery system can significantly reduce the toxicity of drugs, and ensure their controlled release. Almost 90% of drug to date has not achieved its purpose that testifies the relevance of this trend in the pharmaceutical technology.

Key words: nanotechnology, nanocontainers for targeted drug delivery, carbon nanotubes.

Для ссылки: Kamasheva N.V., Ustenova G.O., Omarova R.O., Doszhanova B.A., Baratova I.V. Development of dental gel on basis of nanocontainers for the treatment of viral diseases // Журн. Медицина. – 2015. – №4 (154). – С. 99-100

Nanocontainers thanks to its two basic properties, can be used as a vectors for drugs and diagnostic agents:

– The pharmacokinetics of (absorption, distribution in the body, biotransformation, metabolism) nanocontainers significantly different from the pharmacokinetics of the traditional dosage forms;

– The loaded nanocontainers concentrated a few tens of thousands or more molecules of the drug that affords effective transport of chemical compounds directly to the site of delivery [1].

A significant achievement in the chemotherapy of virus diseases is to create a highly efficient antiherpic means of acyclovir (Zovirax). The cells of acyclovir is phosphorylated and converted to acyclovir triphosphate thereby exerts an inhibitory effect on DNA – virus polymerase [2].

In dental practice antiviral drugs used for prevention and treatment virus damage of the oral mucosa, most often herpes nature. As a rule, the maximal effect is achieved when treatment is started early. Specific treatment virus infections existing chemotherapeutic drugs (acyclovir, bonafton, leukocyte interferon, magniferin, oxoline, riiodoksol, tebroyfen, florenal, helepin et al.) Is often ineffective.

The most often, the main shortcomings of soft dosage forms include:

- Incomplete release of the active substances of the basics;
- The absence or insufficiently high level of penetration of antiviral agents;
- The necessity of using expensive high concentrations of active substances;
- Deficiency a wide range of specific activity;
- The presence of negative side effects and contraindications [3].

Development of the invention is essentially a new drug

not having of domestic analogues, as well as the use of new carrier pharmaceuticals – carbon nanotubes (CNTs). In the development of production technology and an antiviral agent as nanocontainers for drug delivery has been used nanostructured carbon sorbent. It represents a nanomaterial obtained by high-temperature carbonization of secondary waste plant materials (rice husk) [4]. Raw materials based on food processing products is a rapidly renewable and is more environmentally friendly. The resulting nanomaterial used, for example, as an adsorbent, oral administration of the adsorbent, the medical adsorbent of the adsorbent for the absorption of creatinine, header column for purifying of blood, water purifying the adsorbent, masks, adsorbing sheet, a carrier for drugs and carbon-polymer complexes. The basis was chosen the most appropriate type of bases carbopol. According to literature data base polymers possess the ability of releasing with sufficient speed of the medicinal substance wound exudate.

The basis of the development is the task of creating an antiviral medicament for topical application by selecting components that would provide superior therapeutic effect means on the affected tissues, thereby achieving a wide range of specific and high activity with reduced concentrations of the active substance and with simultaneous reduction and except of side effects [5].

Task set is solved by the fact that the antiviral drug for topical application contains the following components (tab.1)

A saturated solution of acyclovir with nanocontainers acyclovir prepared by dissolving in dimethylsulfoxide (DMSO). Allowed to stand for 24 hours. After saturated solution of acyclovir was added 0.3 g mass of carbon nanotubes obtained from carbonized rice husk. Concentrate nanotubes with acyclovir allowed to stand overnight. The resulting concentrate is an active substance for its creation on the basis of various drugs.

Technological process of reception gel consisted of se-

Контакты: Камашева Надежда Вячеславовна, магистрант КазНМУ им. С.Д. Асфендиярова по специальности «Технология фармацевтического производства», г. Алматы, e-mail: nadeka_90@list.ru

Contacts: Nadezhda Vyacheslavovna Kamasheva, master's student of the Kazakh National Medical University named after S.D. Asfendiyarov in the qualification of Industrial Pharmaceutical Technology, Almaty c., e-mail: nadeka_90@list.ru

Table 1 – Composition of gel

No	Components	Mass, %
1	Concentrate nanocontainers with acyclovir	1.36
2	Carbopol	1.0
3	Glycerin	1.0
4	Calia sorbate	0.025
5	Sodium hydroxide	1.5
6	Eucalyptus oil	0.2
7	Purified Water to	100
8	The total weight of the gel	100.0

veral stages: preparation and ancillary medicinal substances, materials, producing gel base, form a gel, homogenizing, for prepacking and wrapping.

At the stage of auxiliary works conducted training and auxiliary of drugs and materials. At the initial stage electronic weighed (analytical) weights required amount carbopol – 1.0, potassium sorbate – 0.025 volumetric burette measure out amount of concentrate necessary nanotube with acyclovir – 1.36, glycerin – 1.0, 10% sodium hydroxide – 1.5, eucalyptus oil – 0.2, purified water – 100 ml. The gel base is prepared as follows: a weighed amount of carbopol was dissolved in water purified. Was heated and stirred at the same time in a water bath at a temperature not exceeding 40°C. The resulting solution was filtered. Then the base was added to the resultant concentrate nanotubes with acyclovir, potassium sorbate, eucalyptus oil, glycerin and mixed thoroughly. To obtain a gelled structure was added dropwise a neutralizing agent – sodium hydroxide [6].

The following steps were carried out homogenization of the gel to obtain a homogeneous gelled mass. Uniformity of mixing due to the compatibility of incoming components gels. The resulting gel in its structure suitable for use. A gel is a homogenous mass a transparent color with odor eucalyptus oil.

Quality evaluation was conducted on all parameters gel (homogeneity, particle size, viscosity, pH, related impurity identification, microbiological purity, quantify and others.).

Indicators to assess the quality of the gel correspond to the necessary requirements of the State Pharmacopoeia of the Republic of Kazakhstan, and temporary analytical document (TAD) project.

Thus, the introduction of a dental practice of fundamentally new drug delivery systems permit to substantially improve the quality of life diseases by reducing the side effects and increase the selectivity and therefore the effectiveness of treatment.

REFERENCES

1 Швец В.И., Лютик А.И. Исследования в области создания эффективных лекарственных препаратов нового поколения включением классических субстанций в наноконтейнеры // Вестник МИТХТ. – 2014. – Т. 9, №3. – С. 11-20

2 Харкевич Д.А. Фармакология. 8 изд. – М.: «Медицина», 2004. – 605 с.

3 Ляпунов Н.А., Безуглая Е.П. «Противовирусное лекарственное средство «герпевир» для местного применения» Патент РФ № 2138265, 1999

4 Мансурова З.А. Углеродные наноструктурированные материалы на основе растительного сырья. – Алматы: Қазақ университеті, 2010. – 301 с.

5 Керманиан Фариборз «Разработка состава и технологии получения геля и линимента алпизарина». Диссертационная работа к.фарм.н. – Москва, 2003. – С. 24-29

6 Сафьянников Н.М., Строганова Е.Н. «Наногель для ультразвуковой диагностики и способ его получения» Патент РФ № 2445121, 2012

Т Ұ Ж Ы Р Ы М

Н.В. КАМАСHEBA, Г.О. УСТЕHOBA, P.A. OMAPOBA, Б.А. ДОCЖAHOBA, И.В. БAPATOBА

С.Ж. Асфендияров атындағы Қазақ ұлттық медицина университеті, Алматы қ.

ВИРУСТЫҚ АУРУЛАРДЫ ЕМДЕУ ҮШІН НАНОКОНТЕЙНЕР НЕГІЗІНДЕ СТОМАТОЛОГИЯЛЫҚ ГЕЛЬДІ ӨЗІРЛЕУ

Классикалық фармация мен фармакологияда кез-келген ауруды емдеу шарасы таблетка, инъекциялық ерітінді, жақпа май түрінде дәстүрлі дәрі дәрілік қабилдату арқылы жүргізіледі. Нәтижесінде дәрі ағзаның бүкіл жасушаларына сіңеді. Соның салдарынан әр түрлі үлгідегі патология басталады. Фармация мен фармакологияны дамыту саласында келешегі бар бағыт, адам бойына дәрі-дәрмектерді жіберудің жаңа құралдарын құру.

Дәрі-дәрмектерді ағзаның дәл керек етілген жеріне жеткізу үшін қолданылатын наноконтейнерлер дәрі-дәрмек заттарының ұйыттылығын елеулі азайта алады және олардың ағзадан шығарылуын бақылау жағын қамтамасыз ете алады. Бүгінге күнге дейін дәрілердің 90% дерлік мақсатына жетпейді, оған дәлел, фармацевтикалық технология саласындағы осы бағыттың өзектілігі.

Негізгі сөздер: нанотехнология, дәрілерді дәл керек жерге жеткізуге арналған наноконтейнерлер, көміртек нанотүтікшелер.

Р Е З Ю М Е

Н.В. КАМАСHEBA, Г.О. УСТЕHOBA, P.A. OMAPOBA, Б.А. ДОCЖAHOBA, И.В. БAPATOBА

Қазақстанның национальнй медицинский университет им. С.Д. Асфендиярова, г. Алматы

РАЗРАБОТКА СТОМАТОЛОГИЧЕСКОГО ГЕЛЯ НА ОСНОВЕ НАНОКОНТЕЙНЕРОВ ДЛЯ ЛЕЧЕНИЯ ВИРУСНЫХ ЗАБОЛЕВАНИЙ

В классической фармации и фармакологии лечение любой болезни осуществляется путем приема традиционных лекарственных форм в виде таблеток, инъекционных растворов, мазей и др. В результате лекарство попадает во все клетки организма. Все это приводит к возникновению различного рода патологии. Наиболее перспективными в области развития фармации и фармакологии является создание новых средств доставки лекарственных средств. Наноконтейнеры, используемые для адресной доставки лекарственных средств, могут значительно снизить токсичность лекарственных веществ, а также обеспечить их контролируемое высвобождение. Почти 90% лекарств до сегодняшнего дня не достигают своей цели, что свидетельствует об актуальности данного направления в фармацевтической технологии.

Ключевые слова: нанотехнология, наноконтейнеры для адресной доставки лекарств, углеродные нанотрубки.

Статья поступила в редакцию 13.04.2015 г.