Polymeric micelles, liposomes, carbonic tubes, nanoparticles and others are used as nanometric carriers for the encapsulation of cyclosporine A. Each of these systems has advantages and limitations regarding pharmacokinetics, toxicity, immunogenicity and specificity for the target tissue.

The aim of the study. Creation of a delivery system for cyclosporine A for oral administration, with a goal of improving bioavailability, solubility and reducing side effects.

Materials and methods. Literature review of data, comparative analysis.

Results and discussion. As an alternative to the production of soft and solid capsules of cyclosporine A, the use of microspheres based on cyclodextrins polymers with this drug is proposed. The use of highly soluble amorphous carriers allows for increase in solubility, bioavailability and improvement of the form of the drug. During the studies, the analysis of circular dichroism showed that the peptide nature of cyclosporine A remains stable after the solid dispersion production process via spray drying. It has been demonstrated that the secondary structure of cyclosporine A in microspheres based on cyclodextrins polymers has not been affected, which is important for the effectiveness of treatment with this antibiotic. In order to avoid precipitation upon dilution in the gastrointestinal tract and to maximize the absorption of hydrophobic drugs, such as cyclosporine A, in the intestine, dissolution tests are required. In vitro results showed that 100% of cyclosporine A was released from the microspheres after 10 minutes, while cyclosporine A in capsules was released only by 76%. The increase in the dissolution rate could be explained by the absence of drug crystallinity and presence of the highly water soluble amorphous form. Bioavailability studies in vivo have demonstrated that cyclosporine A in microspheres based on cyclodextrins polymers exhibits higher bioavailability than cyclosporine A in capsules, while acute toxicity was also not observed.

Conclusions. The newly developed oral delivery system of cyclosporine A, in the form of microspheres, has demonstrated an increase of solubility of cyclosporine A in an aqueous medium. Its solubility is 9.8 times higher than that in the capsule, due to the creation of an amorphous drug form. Also, the particle size and thus the drug wettability were improved. Positive results of the studies may indicate the advantage of using this drug delivery system based on multifunctional amorphous polymer as a solid dispersion carrier for the development of dosage forms containing poor water-soluble drugs.

STUDYING OF SOME BIOLOGICAL PROPERTIES OF SOFT DOSAGE FORMS WITH PROBIOTICS

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Introduction. Nowadays, is observed an increasing interest in meditional and cosmetic products with probiotics, so new brands and lines with probiotics of the most famouse brands has high demand among consumers. Probiotics in the complex remedies for the treatment and care of the skin normalize the microflora of the skin and increase the immunity of the skin. Favorably affect the metabolic processes in the cells, as a result, the dermis becomes more elastic and healthy.

Aim. Select the most effective concentration of the drug with probiotic. To study the protective activity of drugs with probiotic of selected concentration.

Materials and methods. An experiment to determine the optimal concentration and protective activity was carried out on paramecium – culture *Parametium caudatum*. As objects of research were used 2 samples of soft dosage forms with probiotic:1 – Biofresh yoghurt of Bulgaria probiotic face cream (Bulgaria), 2 – cream fluid for face and décolleté with probiotics Elysee Cosmetiques (Ukraine).

A study to determine the optimal concentration of samples of drugs with probiotic. 2 drops of a medium containing paramecium were applied to a glass slide. One drop served as a control, to the second drop was added a drop of a certain concentration dissolved in the saline solution of the sample under investigation (0.5 %, 1 %, 1.5 %, 2 %, 2.5 %, 3 %). Observed 5 minutes for the change in the movement of paramecium: acceleration, deceleration, circular chaotic motion.

The study of protective activity was performed with ethyl alcohol 11% and hydrogen peroxide 1%, which create a pathological model of damage to the cell membrane.

Results and discussion. The results of the study to determine the optimal concentration of the drug with probiotic are given in the table 1.

Analysis of the data shown in Tables 1 indicated that both samples had a beneficial effect on paramecium. As a result of the experiments, we determined the optimal concentration of the samples – 1% and 2%.

Table 1

The results of the study to determine the optimal concentration of the samples

Time, min	Control	Concentration of the sample 1						Concentration of the sample 2					
		0.5%	1%	1.5%	2%	2.5%	3%	0.5%	1%	1.5%	2%	2.5%	3%
1	A	A	A	A	A	A	A	A	A	A	A	A	A
2	A	A	A	F	F	A	A	A	A	A	A	A	A
3	A	A	F	F	F	A	S	A	F	F	F	A	S
4	S	A	F	F	F	S	S	A	F	F	F	S	S
5	S	A	F	F	F	S	S	A	F	F	F	S	S

Notes: Sample 1 – Biofresh yoghurt of Bulgaria probiotic face cream (Bulgaria);
Sample 2 – cream fluid for face and décolleté with probiotics Elysee Cosmetiques (Ukraine);
A – active mooving; S – slow; F – fast.

The next stage of research was the study of the protective activity of two samples of medicinal forms with probiotic in previously selected concentrations of 1% and 2% with respect to cell poisons: ethyl ester 11% and hydrogen peroxide 1%. The results of the study are shown in the table 2.

Table 2

Study of the degree of protection of paramecium against the action of toxicants at the time of stopping

Sample (concentration)	Paramecium stopping time with ethyl alcohol 11%, min	Stopping time of paramecium with solution of hydrogen peroxide 1%, min
Control	2,7±0,02	1,2±0,02
Sample 1 (1 %)	5,17±0,02	1,8±0,02
Sample 1 (2 %)	10,57±0,02	1,08±0,02
Sample 2 (1 %)	4,5±0,02	2,25±0,02
Sample 2 (2 %)	10,5±0,02	2,48±0,02

As seen from the results of the experiment, both samples to selected concentration significantly increased stop time paramecium under the influence of ethyl alcohol and hydrogen peroxide.

Conclusions. As a result of the research, the optimal concentration of soft dosage forms with probiotic was determined for further experiments. It was 1 and 2%. Studying the protective properties with an influence of cellular poisons, a significant increase in the paramecium's stopping time was observed, which proves a high degree of protection of medicinal forms with probiotic.

RESEARCHING OF THE NEW WAYS INSULIN DELIVERING TO PATIENTS

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Introduction. Insulin is a specific hormonal component that makes the regulating blood glucose level possible. Insulin is one of the main objects of the pharmaceutical field of activity, which is manufacturing for using in medicine, in order to treat and support a stable condition of patients with diabetes of all types of disease. At the present time, drugs that contribute to the treatment of diabetes