

VOLGOGRAD STATE MEDICAL UNIVERSITY

DEPARTMENT OF PHARMACOLOGY AND BIOINFORMATICS

Methodological recommendations for students for practical classes

«Immunobiological and gene therapy drugs»

Thematic block: **Immunobiological drugs**

Class topic:

Recombinant drugs: growth hormones and growth factors, hybrid proteins (fusion proteins, chimeric proteins), enzymes, receptors

Faculty of Pharmacy

Objectives of the lesson

- learn to analyze the action of recombinant drugs: growth hormones and growth factors, hybrid proteins (fusion proteins, chimeric proteins), enzymes, receptors based on the totality of their pharmacological properties, mechanisms and localization of action;
- learn to evaluate the possibilities of using recombinant drugs: growth hormones and growth factors, hybrid proteins (fusion proteins, chimeric proteins), enzymes, receptors for the purposes of pharmacotherapy;

2. THE FOLLOWING PRACTICAL SKILLS AND ABILITIES ARE PRACTISED IN THE CLASS

- ability to organize the possibility of using recombinant drugs: growth hormones and growth factors, hybrid proteins (fusion proteins, chimeric proteins), enzymes, receptors for the treatment and prevention of diseases;
- ability to evaluate the possibility of using recombinant drugs: growth hormones and growth factors, hybrid proteins (fusion proteins, chimeric proteins), enzymes, receptors depending on the spectrum of their activity
- ability to analyze possible side and toxic effects of recombinant drugs: growth hormones and growth factors, hybrid proteins (fusion proteins, chimeric proteins), enzymes, receptors.

Formed competencies: YK-1.1.3.; YK-1.2.1, YK-1.2.2, YK-1.2.3.; YK-1.3.1, YK-1.3.2.; YK-6.1.1.; YK-6.2.1, YK-6.2.2.; YK-6.3.1, YK-6.3.2, YK-6.3.3, YK-6.3.4.; ОПК-1.1.1.; ОПК-1.2.1, ОПК-1.2.2.; ОПК-1.3.1.; ОПК-6.1.1.; ОПК-6.2.1.; ОПК-6.3.1.; ПК-7.1.1.; ПК-7.2.1.; ПК-7.3.1.

Brief summary of the topic, suggested questions for discussion:

1. Growth hormone.
2. Regulation of secretion of hormones of the hypothalamus and pituitary gland.
 - 2.1 Somatotropin-releasing factor (GH-RH)
 - 2.2 Somatostatin-14
 - 2.3 Insulin-like growth factors I and II (IGF-I, IGF-II)
 - 2.4 Insulin-like growth factor binding protein-1 (IGFBP-1)
 - 2.5 Insulin-like growth factor binding protein-3 (IGFBP-3)
3. Hybrid proteins (fusion proteins).

3. Interferons. IFN α , IFN β , IFN γ .
4. Recombinant enzymes
5. Recombinant receptors

Provide a pharmacological description (group (composition), indications for use, side effects) of recombinant proteins and enzymes:

Recombinant drug	Group (composition)	Indications for use	Side effects
Neulasta			
PegIntron			
Abatacept			
Rituximab			
Denosumab			
Infliximab			
Asparaginase			
Desmoteplase			
Dornase			
Nattokinase			

Topics of abstracts on the topic: Recombinant drugs: growth hormones and growth factors, hybrid proteins (fusion proteins, chimeric proteins), enzymes, receptors:

1. Growth hormone. Participation in metabolic processes. Diseases associated with impaired regulation of growth hormone synthesis.
2. Recombinant adenosine receptor preparations.
3. Recombinant dopamine receptor preparations.

List of recommended literature, professional databases, information reference systems, electronic educational resources recommended for preparing abstracts:

1. Sanchez-Garcia L. et al. Recombinant pharmaceuticals from microbial cells: a 2015 update //Microbial cell factories. – 2016. – Т. 15. – С. 1-7.
2. Buckel P. (ed.). Recombinant protein drugs. – Springer Science & Business Media, 2001.
3. Parker M., Li Z. Biotechnology and drugs //Remington. – Academic Press, 2021. – С. 397-415.
4. Клинико-фармакологические характеристики биотехнологических лекарственных препаратов: от классификаций до нежелательных явлений / под общей редакцией Колбина А. С. [Зырянов С. К., Белоусов Д. Ю., Бойченко Э. Г., Бутранова О. И., Емельянова Л. И., Казанова А. М.]. — М. : Издательство ОКИ, 2024. — 84 с.

Independent work of students:

1. Pharmacological characteristics of drugs (required drugs are entered into workbooks).
2. Solving situational problems on the topic. The solutions to the problems are entered into workbooks.
3. Working with advertising brochures of drugs on this topic.