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# MEDICAL APPLICATIONS OF MEMBRANE TECHNOLOGY

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A LECTURE COURSE

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## **Annotation:**

These lecture notes “Medical applications of membrane technology” consist of assorted information sources, which were collected for the purpose of reviewing own publications and current state of the field, dedicated to medical applications of membrane technology. This annotated literature review might be used for writing a monograph or a text-book “Membranes in medicine”. It sheds light on clinical applications of membrane technology (particularly, polymers with high-permeability and high-selectivity) for prevention, patient treatment and rehabilitation. These notes provide a brief overview of mathematical models of low-molecular weight compounds diffusion in artificial (i.e. polymer) and natural membranes. A few words are said about processes of migration, diffusion and mass-transfer in living organisms (in particular, in human body), including transdermal transfer. Special emphasis is made on preparation and mixing of medical gases (oxygen/nitrogen, xenon/oxygen and radon/air) in systems, containing diffusion type asymmetrical membranes.

The author discusses development of membrane systems for such applications as xenon anesthesia, blood oxygenation and hypoxia, hemodialysis systems (*artificial kidney*). He touches upon their usage as protective coatings for skin wounds and burns (i.e. selective polymer membrane as artificial skin) and as shells(encapsulating material) for drug depots. Concluding parts of the text-book are devoted to methods of drug administration (especially, administration of radiopharmaceuticals and radioprotective agents) via transdermal transfer.

This synopsis can serve as a “work-book” addendum for lecture course “Diffusion: theory and practical applications”. Some examples in the text are used in the course “Radiation and nuclear medicine” by the same author. Complete text of mentioned lectures can be found at **<http://profbeckman.narod.ru>**

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*The annotation and ToC were translated by: Dr. V. Deineko*