

Methodology of Biomedical Research

- The pace of biomedical research is unrelenting. While the traditional methodology of subcellular fractionation, gene cloning and sequencing or expression analysis are still used daily in laboratories, the way it is done has changed substantially over the years. Additionally, discovery of novel ways of studying gene function have been developed.

- The aim of this course is to familiarize the students with the traditional as well as recent advances in the research methodology with the focus on the molecular biology and genetic techniques. Additionally, selected model organisms used in biomedical research will be discussed. At the end of this course the student is expected to:

- understand the advantages and the limitations of most common experimental research strategies in biomedical research
- understand concept of control experiments
- be able to read critically articles describing the molecular basis of disease
- be able to design a research protocol to answer a question about a gene function

The following methodological errors are observed in biomedical sciences:

- paradigmatic ones;
 - those of exaggerated search for certainty;
 - science dehumanisation;
 - deterministic and linearity;

- Those of making conclusions;
 - errors of reductionism or quality decomposition as well as exaggerated enlargement;
 - errors connected with discarding odd;
 - unexpected or awkward facts

- those of exaggerated mathematization;
 - isolation of science;
 - the error of "common sense";
 - Ceteris Paribus law's ("other things being equal" laws) error;
 - "youth" and common sense;
 - inflexibility of criteria of the truth

- Errors of restricting the sources of truth and ways of searching for truth;
- the error connected with wisdom gained post factum;
- the errors of wrong interpretation of research mission;
- "laziness" to repeat the experiment as well as the errors of coordination of errors.

- One of the basic aims for the present-day scholars of biomedicine is, therefore, mastering the new non-linear, holistic, complex way of thinking that will, undoubtedly, enable one to make less errors doing research. The aim of "scientific travelling" will be achieved with greater probability if the "travelling" itself is performed with great probability.