THE BASIC BIOMEDICAL RESEARCH - FROM WHERE WE START

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By the definition the science is new, reproducible and useful knowledge. One of tha main ways to obtain that "new knowledge" is by doing research. On the other hand, the research can be defined as a searching for new, reproducible and applicable knowledge. It is an endeavour to discover new facts, procedures, methods, and techniques by the appropriate scientific study (The Concise Oxford Dictionary), and systemic investigation towards increasing the sum of knowledge (Chambers 20th Century Dictionary). Generally, in medicine research can be divided into basic, clinical, and epidemiological research. In all types of research, new knowledge is done by doing specific studies, which also can be basic, clinical and epidemiological. Basic medical research is also called fundamental or experimental research. It usually involves animal experiments, cell or cell culture studies, biochemical, genetic and physiological investigations, and studies on the properties of drugs and materials. In this type of experiments, at least one independent variable is changed and the effects on the dependent variable are investigated. The main advantage of this type of study is that experimental conditions and the experimental design can be precisely specified and controlled. It is also important that cofounding factors can be controlled or reduced. Also, many types of experiments are standardized and one should be able to repeat the research result in any other laboratory all around the world. The reproducibility of research is one of the main characteristics of a good experimental design. Basic biomedical research also includes the development and improvement of different analytical procedures (analytical determination of enzymes, genes, intracellular signaling pathways, gene sequencing), imaging procedures (computed tomography, magnetic resonance imaging, ultrasound imaging). Different mathematical procedures, such as statistical tests, experimental modeling and statistical evaluation, are also part of basic medical research.

Why the basic biomedical research is important?

The basic medical research is important

because it is necessary to generate new knowledge and tehnology to deal with major unsolved issues. It usually covers different areas: biology, biochemistry, biophysics, mathematics, statistics, together with physiology and organ function or disease mechanisms. Based on all above mentioned facts, it is important to develop and maintain the basic medical research, because it is the starting point for all other knowledge and the first place where young scientist enter into scientific community, and learn about basic technologies used in research, and where they are trained about study designs, statistical methods, handling with animals and research ethics, and to write researsh projects. It is also a source for new tools, models, and techniques (e.g., knockout mice, new drugs and compounds). First steps in scientific communication and teamwork are also taught during the first contact with science, and different research problems where we often need to seek help frm other colleagues. Here is one example of basic research: „In February 2021, Dr. Da-Neng Wang's research team (at the NYU School of Medicine) published the first report on the 3D structure of the human sodium-dependent citrate transporter (NaCT) protein - the instructions to make this protein are in the SLC13A5 gene. This research discovery carries important implications for patients with SLC13A5 Epilepsy". So, it is starting point to make a drug for epilepsy. Without the knowledge on the structure od this particular sodium channel, specific drugs for the tretamnet of epilepsy coud not be developed (Figure 1).

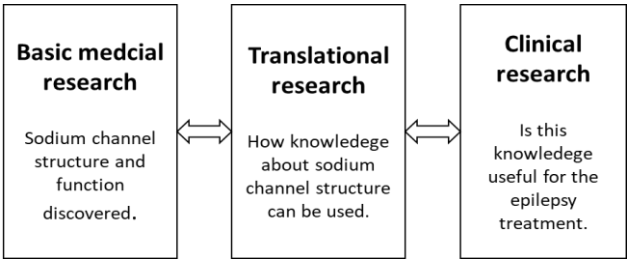

Figure 1. - *The connection between basic research with translational and clinical research*

CONCLUSION

Therefore, a good basic medical research is necessary to be established in every institution. At the end, we can cite prof. O. Sinanović: "In the desire for the greatest possible scope of knowledge and the possibility of providing the highest quality health care, educating students and teaching staff, science at the Faculty of Health Studies is an unquestionable need and obligation". Nine years of existence of *Health Bulletin* intended for publication of the best works of scientific work and establishment of the Doctoral Study at the *Faculty of Health Studies* is a good way of promoting science and medical research.

LITERATURE

1. Marušić M. Health profession and science. Health Bulletin 2015; 1(2): 9-14.
2. Mimica M, Babić D, Vasilj I. Importance and significance of science at the Faculty of Health Studies. Health Bulletin 2015; 1(1): 9-12
3. Marušić M i suradnici. Introduction into scientific work in medicine. 5th edition. Zagreb: Medicinska naklada, 2013.
4. Sinanović O, Babić D. The need and obligation of science at the Faculty of Health Studies. Health Bulletin. 2016;2:9-13.
5. Martinac M. Development of nursing as a basic science. Health Bulletin 2022. Vol. 8. No. 2.
6. TESS Research Foundation (visited on May 7th, 2024.).