Identifying and solving scientific problems in the medicine: key to become a competent scientist

Abstract: The scientific method can be described as a multistep and detailed process, in which finding the best question is the first and most crucial step. Thus, scientific problem should be examined thoroughly in different ways and perspectives. The amount and diversity of scientific data are enormously increasing and becoming more specific day by day, therefore traditional observational biology is not sufficient on an individual basis to understand and treat multifactorial diseases. Moreover, protocols, documentations, information, outcomes,precisions, and considerations of evidence should be improved to answer scientific questions correctly during the scientific research. Because of the diversity of the data and the methods, statisticians and methodologists should be involved and contribute to the all stages of research. Besides that, all scientific data should be certainly reproducible and repeatable. Scientific knowledge is in a state of flux and becomes more complex day by day. Thus, becoming a competent scientist needs, abilities and skills such as creativity, hardworking and self-discipline that all requires lifelong learning, searching, and widening scientific horizons consistently.

Keywords: Scientific method; medical research; finding problem; new scientific world.

Introduction

The scientific method in medicine is comprised of research design, conducting research, data analyzing and interpretation that all contribute to the solving specified
problems. Research design types can be categorized as a case study, survey, observational study, semi-experimental, experimental, review, meta-analytic or comparative [1]. However, before choosing research design type in medicine, finding the best question of which either comprises huge populations such as patients with diabetes, cancer or affects small groups like people with rare diseases is the first and most crucial step. Although rare diseases impact fewer human beings, in total many people are affected from them in the worldwide since there are no cure [2–4].

Present problems in the medical and biological sciences should be examined thoroughly in different ways and perspectives to find the best scientific question. Therefore, researchers should widen their scientific horizons consistently and should develop deep insight in their specific fields [5–11]. The amount and diversity of scientific data are enormously increasing and becoming more specific day by day. Therefore, traditional observational biology is not sufficient alone to understand and treat multifactorial diseases such as obesity, cancer or neurological disorders. Every data contributes to the scientific knowledge in the worldwide. Thus, access to the largest data by using omic technologies such as lipidomics, metabolics, proteomics, genomics, etc. has led to the revolution in the medical and biological sciences, that enable scientist to reveal complex mechanisms behind various diseases which affect either huge or small populations. Thus, not only determining the problem, but also knowing how to analyze and integrate the scientific data is crucial to become a competent scientist [4–10].

Protocols, documentations, information, outcomes, precisions and considerations of evidence should be improved for data analysis and interpretation. However, in research design there are also other factors affecting the research quality, for instance originality, instruments used in the experiments that all parameters together contribute to the increasing validity and the reliability of a research [11]. Also, since methods using in each field are diversifying day by day, choosing the best and most effective methods play a vital role to obtain the most accurate and reliable data. Therefore, statisticians and methodologists should be involved and contribute to the all stages of medical and biological research. Besides that, all scientific data and procedure should be certainly reproducible and repeatable in every area of the discipline including medicine [11].

The scientific world is continuously in progress and improving itself day by day. New methods and data analyzing approaches, including various omic technologies revolutionize the medical research field. Thus, researchers encounter new concepts such as subtyping patients with diseases to reveal biomarker that enables us to discover personalized medicine techniques. Personalized treatments are promising therapeutic approaches which increasing efficacy of the treatment and reducing side effects. These factors enable us to predict disease susceptibility that all together contribute to the improving human health [10–12].

The researcher’s creativity, critical thinking skills, abilities and successes are directly correlated with the researchers’ deep knowledge on a specific topic, current technologies, data analysis and interpretation. Since science continues from past to present, every step we follow reflects an evolutionary step on the way. Scientific knowledge is in a state of flux and becomes more complex and competitive day by day. Therefore, being a competent scientist needs various skills such as creativity, hardworking and self-discipline, since this process is a lifelong journey requiring consistently learning, searching, and widening scientific horizons for a lifetime.

Conclusion

Currently the world has realized the importance and the need of describing reasons of various public health concerns, since this is the key to solving them. Therefore, finding the best question of which either comprises huge populations or affects small groups is the first and most crucial step in the medical and biological sciences. The amount and diversity of scientific data and novel methods are enormously increasing and becoming more specific day by day. Therefore, a researcher’s creative and critical thinking, abilities and successes are directly correlated with the researchers’ deep knowledge on a specific topic, current technologies, data analysis and interpretation.

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