

Clinical and basic researchers: working together for better health

In many cases, one does not need to wander around a medical or dental faculty for too long to notice that it is divided into two separate planets – basic research and clinical science. While basic researchers often ask “why” and focus on deeper understanding of mechanisms and processes, clinical scientists typically ask “what” or “how” and focus on studying patients’ clinical outcomes and treatments. These two groups of researchers often work remarkably independently, so that they seem to speak two distinct “scientific” languages, with no easy translation between them. Even though the groups work in the same faculty and sometimes study the same diseases and conditions, it seems like the work is done in silos with few collaborative efforts and thought exchange. Diversity in science can help by asking different questions and looking at the same problem from various angles while using unique techniques that are specific to each group. This might result in tackling an issue, may it be a disease, condition, diagnostic tool, or treatment, from several distinct directions, increasing the likelihood of finding a novel solution, eventually helping patients. The question that is often asked is how can we bridge the gap between those two planets?

Before answering this question, it is critical to understand and value how basic science can benefit from the clinic, and vice versa. As the name suggests, the center of attention of basic science involves fundamental mechanisms, thus, most of the time, it is limited to the laboratory borders. The majority of basic scientists are not exposed to patients or the procedures performed in the clinic. As a result, they might not be familiar with the knowledge gaps that are relevant to patient care. Without getting the proper information and communication from the clinic floor, how can they really know what should be improved? What questions need an immediate answer? What will help the clinical world improve patients’ wellbeing? Alternatively, how will they know that their new developments are practical and will be of meaningful help?

It can seem like some groups of basic researchers are not really interested in translating their science into the practical world, and that their passion is studying the essential processes critical for appropriate function. How can these scientists benefit from clinical research? The answer is simple: by proving that their ideas are also valid in a human context. Many basic research laboratories work with animal models and cell lines, and while cell lines might originate from humans, they are still manipulated and thus might result in artifacts and biased observations. These also lack the multifactorial environment of the human body. In the lab, researchers will try to best mimic human tissues; on the other side of the same institution, clinicians may remove tissues from patients on a daily basis and, at the end of the day, throw them away. These tissues could be of utmost importance and value for the fundamental researcher and, hence, direct communication between the disciplines will help to turn the “trash” of the clinics into treasure at the basic science lab.

Basic and clinical sciences exist in symbiosis and, thus, clinical researchers can gain a lot from the knowledge and expertise embedded in basic science. Clinicians frequently see many patients and encounter different cases on a daily basis. They need to decide on the right treatment for each case. This intense routine does not always allow them to stop and ask “why” – Why does this procedure work better? Why do we use this material in this particular case? Why does this patient present with symptoms specifically at this time? Even if the clinicians and clinical scientists understand and acknowledge the gaps that need to be filled, they might not have the appropriate expertise to thoroughly study them in order to deliver the best answer. Discussion and collaboration with basic scientists can help to understand why underlying processes of disease work in a certain way, why specific materials or medications are better in particular cases, and why this step or another is critical for diagnosis or improvement in patient wellbeing. In this way,



improving diagnosis, treatments, and procedures will have not only practical reasons but also a deep scientific logic and proof.

Medical and dental sciences are one continuous world that includes a spectrum of disciplines. While the clinical and basic fields might be two extremes, they still depend on and connect to each other. Advances in one will dramatically promote the other.

Medical and dental faculties, granting agencies, and decision makers should encourage, support, and facilitate active discussion between fundamental scientists and clinical researchers. Frequent conversations, brainstorming, and collaborative efforts to ask the relevant questions and seek the proper answers are key to better translational research. Joint seminars and research presentations, where each group shares their work, followed by multidisciplinary discussion, will enhance communication and enable groups to better understand the research that is being done in other labs or clinical settings. Having these timely interactions and breaking the walls between basic and clinical research will enable the goals of health care professionals to be reached. We all need to start speaking the same language and to try to bring the “other side” closer to us so we can work together for the benefit of our profession and for the wellbeing of our patients.

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