‘Provide a potential therapeutic target’ should not be overused in basic biomedical studies

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Perspective

Abstract: A large number of authors tend to describe as ‘this study provides a potential therapeutic targets for treatment of …’ when emphasize the significance of their biomedical studies, however, most of which did not, or failed to continue further translational investigations after their scientific paper were published. Here, taking those basic biomedical studies in the field of neuroscience for example, this letter is trying to propose that basic biomedical studies should not over-dramatize their significance as ‘provide a potential therapeutic target’ before examining the systemic treatment effects of the potential targets in intact experimental subjects.

Key words: Biomedical study; therapeutic target overuse.

Background

Basic biomedical studies could be categorized into two types by their final purpose: to dissect the nature of physiological or pathophysiological process (type I), or to find therapeutic targets of a disease or specific symptoms of the disease (type II). There is no clear borderline between the two, most of the type II studies should be included in type I except for those studies aiming for the treatment effect of some medicine or strategies via unknown mechanisms. Biomedical studies are developing to a more and more detailed and accurate direction with the emergence of more cutting-edge specific tools and strategies, such as high-selective agonists or antagonists, transgene animals and conditionally-expressed virus and optogenetics (1). And precision medicine, has largely promoted recently and internationally (2,3). Under this condition, some authors tend to, but should not, locate their work into type II studies when they found a specific molecule, a specific type of cells, brain areas or neural circuit contributing to the initiation, development or maintenance of a disease or one of the symptoms of this disease. Another example in the field of oncology is c-met receptor, emerging evidence have shown this molecule had a great potential to be targeted for drug development in basic studies (4,5), however, many of the c-met receptor-related clinical trials have failed.

There are two reasons I believe to persuade them not to do this even they performed some region-, cell type-, or circuit-specific interventions and did observe treatment effects. First, almost all currently-available drugs or strategies are administrated and reached their treatment effects in a systemic manner, such as oral administration, intraperitoneal or intravenous injection. In this point, the systemic therapeutic effects should be evaluated in intact experimental subjects, and are much closer to the translational use for the ‘potential therapeutic target’ in human patients. Second, a specific molecule or cell type could express in different parts of the nervous system, even in non-nervous tissues, same types of neurons in a specific brain areas might project to different downstream targets and function differently, even oppositely in a specific pathological process (6).

Appeals

Based on the background and evidence above, I appeal that: (1) ‘provide a potential therapeutic target’ should not be overused in basic biomedical studies. Therapeutic effects of the ‘potential therapeutic target’ should be validated with systemic methods. It would be a better alternative to describe these investigating targets as ‘potential mediators’ or ‘play a role in the pathophysiology of’ a specific disease. (2). More specific translational techniques are needed to be developed to take good advantage of the findings of type I studies. Obviously, it is a long way to go. (3). More and more studies focus on the interactions between different structures under a specific pathological conditions, and take the disease state as an integrative process. These practices lead us to believe that some integrative interventions, such as acupuncture technique in traditional Chinese medicine, might be useful and contribute more in future therapeutic exploration in biomedical studies.

References
