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EDITORIAL

Animal models in psychiatry

Antonio L. Teixeira,[1] João Quevedo[2]

[1]*Interdisciplinary Laboratory of Medical Investigation, School of Medicine, and Instituto de Estudos Avançados Transdisciplinares (IEAT), Universidade Federal de Minas Gerais (UFMG), Belo Horizonte, MG, Brazil.* [2]*Laboratory of Neurosciences, National Science and Technology Institute for Translational Medicine (INCT-TM), Center of Excellence in Applied Neurosciences of Santa Catarina (NENASC), Graduate Program in Health Sciences, Health Sciences Unit, Universidade do Extremo Sul Catarinense (UNESC), Criciúma, SC, Brazil.*

Animal models are widely used in biomedical research for their ability to emulate several human physiological and pathological processes. These models may provide significant insights into the molecular and cellular basis of human diseases, contributing to the development of new therapeutics and integrating preclinical pharmacological studies.

For instance, since the first half of the 20th century, experimental autoimmune encephalomyelitis (EAE) has been used as an animal model of multiple sclerosis, an autoimmune inflammatory demyelinating disease of the central nervous system. Experiments were performed first in monkeys and later in other species, including mice and rats, using different encephalitogenic peptides.[1,2] Besides advancing our understanding of the pathogenesis of multiple sclerosis, EAE models have been used extensively to screen for new therapeutic targets of the disease, leading to the development of strategies currently used in clinical practice, such as glatiramer acetate and natalizumab.

However, modeling psychiatric disorders is much more complex than other diseases such as multiple sclerosis, which is mainly characterized by motor and sensory symptoms. In the case of EAE, the animal model of multiple sclerosis, motor tests provide a good readout of neurological function and, hence, of disease state.[3] How can disorders like schizophrenia, diagnosed by hallucinations and delusions, be studied using rodent models? Even the best animal models of psychiatric disorders cannot capture some features of the corresponding human diseases, especially those related to the subjective experience.[4] Conversely, other relevant features can be modeled, making animal models very useful in psychiatry. For instance, traditional anxiety-related tasks for rodents include exploratory and approach-avoidance conflict paradigms that show face validity (animal behavior matches the behavior observed in human subjects) and predictive validity (response to anxiolytic drugs in both animals and humans) for human anxiety disorders.[5] Animal models of anxiety do not intend to replicate all features of a specific anxiety disorder, and there is even a consensus that reproducing a whole psychiatric syndrome is not possible (Campos et al.,[6] this issue). Therefore, animal models in psychiatry may not be perfect, but they are useful (Salgado & Sandner, this issue).[7] It is worth emphasizing that this statement also applies to animal models of other diseases.

To address the current understanding of this important area of basic science in psychiatry, this supplement of Revista Brasileira de Psiquiatria brings several reviews on animal models of anxiety/stress,[6] depression,[8,9] psychosis,[10] alcohol and drug dependence,[11] and neurodegenerative diseases.[12] One paper also addresses in vitro models of neurodegenerative diseases that can provide complementary information to in vivo or animal studies investigating the mechanisms of neurodegeneration.[13] These reviews were written by Brazilian researchers, some with the collaboration of international experts. Advances achieved through behavioral research in animals and current constraints in each area are presented. With psychiatric diagnostic criteria in constant change, development of animal models beyond the traditional domains of anxiety, depression, or psychosis is warranted.[14] This and other challenges faced by behavioral researchers are also discussed.

Disclosure

The authors report no conflicts of interest.

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