



# **Animal Models for the Study of Human Disease: Chapter 24. Animal Models and Methods to Study the Relationships Between Brain and Tissues in Metabolic Regulation**

*Luc Penicaud, Alexandre Benani, Frédérique Datiche, Xavier Fioramonti, Corinne Leloup, Fabienne Lienard*

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The constant increase in the number of obese and diabetic patients, which has become a concern of public health, is the consequence of dysregulations in energy homeostasis. Communications between the brain and peripheral tissues play a critical role in this regulation. Studying the brain-periphery axis has become a critical field of research. This chapter lists a panel of concepts, approaches, tools and techniques scientists possess to study the brain-periphery axis in the regulation of energy homeostasis. We focused on techniques used in vivo to stimulate the brain such as the stereotaxy, electrical stimulation, vascular surgery and optogenetic. We described tools and approaches used to study in vivo and in vitro response of neural cells to metabolic stimuli such as electrophysiology, cellular imaging, microdialysis and c-fos mapping. Finally, approaches used to study peripheral behavioral and metabolic responses such as food intake and body weight monitoring and glucose clamps are presented.

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