Animal Models in Neuroscience

The Forced Swimming Test: A Model of Depression[12,17]

Depression is a clinically important indication, but it is difficult to model in animals. It is described in humans as a pathological complex of somatic, neuroendocrine, and of course, psychological symptoms. Replicating these symptoms in animal model, rodents or otherwise, is not possible, and as such, drug discovery programs aimed toward the development of novel antidepressant depend on specific measurable behaviors that are predictive of antidepressant activity in humans. The forced swimming test, originally described by Porsolt et al. has been effectively employed to identify novel antidepressants by monitoring the behavior of mice placed in an inescapable cylinder of water. When initially placed in the cylinder, a mouse will swim and search for a means of escape. Eventually, the mouse will stop attempting to find a way out of the cylinder, adopt a characteristic floating position, and move only enough to keep its head above water. In the original paper, Porsolt et al. were able to correlate an increase in activity in mice treated with known antidepressants as compared to untreated mice, establishing a correlation between mouse behavior and human depression (Figure 7.1).

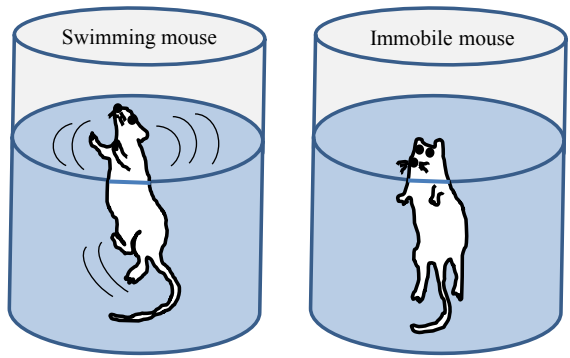

FIGURE 7.1 In the Porsolt forced swimming test, compounds with antidepressant properties will extend the length of time a mouse will continue to swim attempting to find an exit to the chamber. This experimental model has been successfully employed to identify novel antidepressants.

The Elevated Plus Maze: A Measure of Anxiety[18]

Similar to depression, anxiety is a complex disorder in humans that is not easily recapitulated in animal models. Several models have been developed to assess the antianxiolytic activity of novel compounds. The elevated plus