

Two Major Research Strategies of the Neurosciences

Top-Down Approach: This approach starts with some behavior or experience/mental activity, and applies various research techniques (e.g., lesioning, stimulating, recording electrochemical activity such as the EEG and ERPs, or visualizing such as with PET and MRI) in order to determine which brain structures are involved and their roles. An example would be studies of memory and learning leading to an understanding of the roles of the limbic system hippocampus, prefrontal cortical lobes, basal ganglia, and cerebellum of the brain.

Bottom-Up Approach: This approach starts with the basic elements of the nervous system (its neurons etc.) and investigates their properties, how they are assembled into functional systems, and how they interact, i.e. work together to produce and regulate the behaviors and experiences/mental activities of the organism. An example would be single-cell/neuron studies of the visual system.

Both strategies are useful and are being employed in laboratories throughout the world.