

Jean Hardwick section 08

The main focus of my research is to investigate the control of neural inputs to the heart. The heart is controlled by the autonomic nervous system (ANS). Previously, it was thought that the main “decision-making” centers for cardiovascular regulation were all in the central nervous system. Neurons found in the peripheral nervous system, that are a part of the ANS, were thought to serve primarily as relay stations for transferring commands from the brain to the heart. However, more recent studies suggest that these peripheral neurons can take in information from many sources and change their activity based upon this input. Thus, there is evidence for local “decision making” as well as central controls.

The projects in my lab examine different types of inputs which may alter neuronal control of the heart. Using immunohistochemical techniques (to visualize the specific peptide neurotransmitters), electrophysiological techniques (to monitor the changes in neuronal activity) and molecular techniques (to observe changes in gene expression), we can examine the integration of different neural inputs on the control of cardiac function.

One major area of research in the lab is to explore the interaction of mast cells (part of the immune system) with the regulation of heart. Chronic cardiac disease leads to elevations in the number of mast cells in the heart and also leads to increases in the amount of an important regulatory molecule, nitric oxide. This project explores the interaction of these mast cells and nitric oxide with the neurons responsible for decreasing cardiac activity. We are interested in determining 1) the specific actions of nitric oxide on neuronal activity using electrophysiological techniques and 2) the regulation of nitric oxide production using immunohistochemical and molecular biology techniques.