The catabolic process of macroautophagy, hereafter referred to as autophagy, is evolutionarily conserved from yeast to mammals. During the last 10 to 15 years our understanding on the overall molecular components and functional importance of this process has improved substantially; yet it has become increasingly evident that the modulation of autophagy, and its interaction with other cellular pathways occurs in a tissue-specific manner. In this talk I will present studies demonstrating how autophagy impacts cardiac and skeletal muscle adaptation to exercise and calorie restriction. Recent findings on autophagy regulation in muscle will also be discussed.