Cardiovascular diseases are considered the leading cause of death nowadays. Hypertension, obesity and type-2 diabetes are deemed major risk factors for the development of cardiovascular diseases. In essential hypertension, or cases in which the development of the disease has no obvious reason, one of the most important structural changes in the resistance vasculature is the reduction of the luminal diameter, known as inward remodeling. I found that inwardly remodeled cremasteric-arterioles from rats undergo strong structural modifications of their actin components, which results in affected mechanical responses. Using a spontaneously hypertensive rat model, I found evidence that suggests that, in essential hypertension, in addition to the structural modifications, the mechanisms that control vasoconstriction and vasodilation are impaired. Obesity is considered to increase the risk for developing hypertension and type-2 diabetes. The prevalence of obesity has increased dramatically in the last few decades, this is primarily due to a sedentary lifestyle and poor eating habits. Mesenteric arterioles from mice fed a diet high in fats and sugars were observed to undergo both structural and functional modifications. Obesity and type-2 diabetes have been associated with insulin resistance, impaired vascular function and arterial stiffening. In a series of experiments, I found that arterioles from the jejunum of diabetic obese-patients undergoing roux-en-y gastric bypass had a reduced vasorelaxation to insulin in comparison to obese non-diabetics. These results are evidence that, in type-2 diabetes, the presence of a blunted insulin-vasodilation response is a form of impaired vascular function that is not associated with obesity.