In recent years, the importance of alterations of cardiac autonomic nerve function in the pathophysiology of heart diseases including heart failure, arrhythmia, ische-mic heart disease, and diabetes has been increasingly recognized. Several radiolabeled compounds have been synthesized for noninvasive imaging, including single photon emission CT and positron emission tomography (PET). The catecholamine analogue I-123 metaiodobenzylguanidine (MIBG) is the most commonly used tracer for mapping of myocardial presynaptic sympathetic innervation on a broad clinical basis. In addition, radiolabeled catecholamines and catecholamine analogues are available for PET imaging, which allows absolute quantification and tracer kinetics modeling. Postsynaptic receptor PET imaging added new insights into mechanisms of heart disease. These advanced imaging techniques provide noninvasive, repeatable in vivo information of autonomic nerve function in the human heart and are promising for providing profound insights into molecular pathophysiology, monitoring of treatment, and determination of individual outcome.