Neuroendocrine tumors (NET) are defined by biochemical characteristics and structures which can be specifically addressed by radioligands for diagnostic imaging as well as radionuclide therapy in nuclear medicine. Somatostatin receptor imaging has been shown to be an important part of the diagnostic process in the management of NET for a long time. In recent years a number of tracers enabling PET-based imaging of somatostatin receptors and amine precursor uptake have been developed. By combining the specific functional information of the PET signal with anatomical information by CT imaging using PET-CT hybrid scanners, primary tumors and metastases can be detected with high resolution and high sensitivity. Compared with conventional indium-111 octreotide scintigraphy PET-CT has a higher resolution and also a lower radiation exposure. In addition, quantification of the tracer uptake allows therapy monitoring. By labelling with therapeutic beta-emitters, such as lutetium-177 or yttrium-90, a systemic internal radiotherapy with somotostatin analogues (peptide radionuclide radiation therapy, PRRT) can be provided as a therapeutic option for patients with unresectable and metastasized neuroendocrine tumors.