In the fall of 1997, the NationalCancer Institute of the National Institute of Health sponsored a two-day workshop on oncologic imaging. A number of radiation scientists and clinicians presented and discussed recent advances in the imaging of human cancers with a view for application in cancer therapy. Represented were the specialties of radiotherapy, magnetic resonance, nuclear medicine, digital radiology and medical physics. This symposium is a capsule summary of that workshop with an emphasis on how magnetic resonance and positron emission imaging may benefit radiation therapy. Magnetic resonance imaging of perfusion/diffusion or of metabolic pathways (e.g. in terms of choline/citrate ratio) may yield geographic and/or radiobiological information relevant to radiotherapy. PET imaging, e.g. FDG metabolic studies, IUDR studies of mitotic activities, and F-misonidazole identification of hypoxia, may provide rationale for specific treatment strategy. Information from these biological imaging approaches may enhance the efficacy of radiotherapy, and specifically, may guide “dose painting” – the new capability made possible by intensity-modulated radiotherapy.