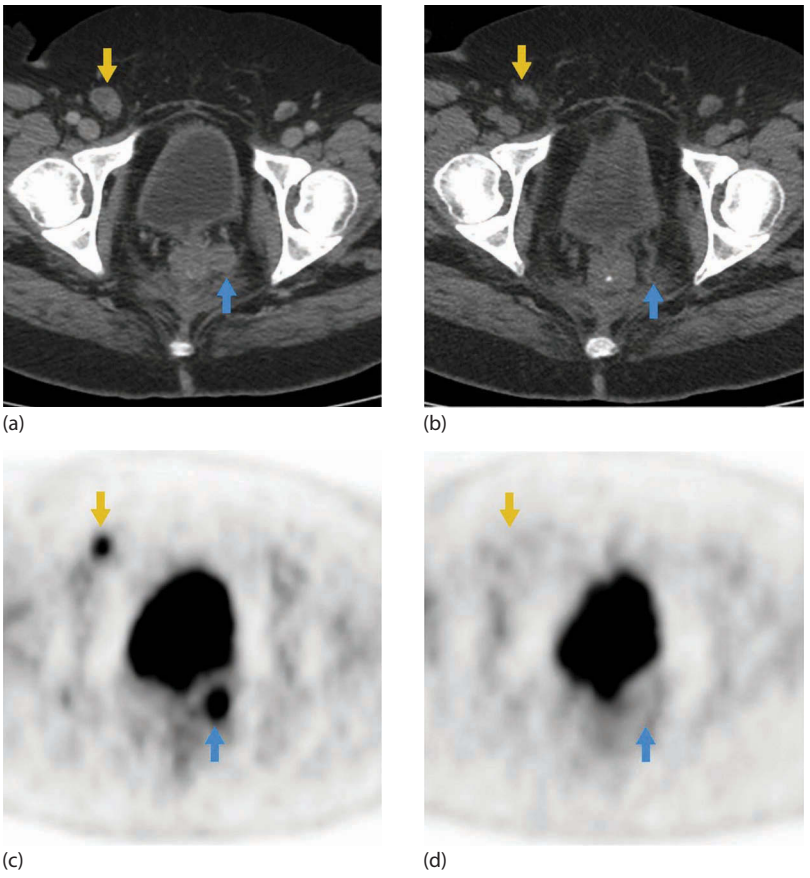

FIGURE 8.11 Cross-sectional axial CT (a and b) and [^{18}F]FDG PET (c and d) images from cancer patient responding to imatinib mesylate treatment. a and c are prior to and b and d are after 1 month of therapy. (Reprinted with permission from Hodi, F. et al., *J. Clin. Oncol*., 31(26), 3182–3190. Copyright 2013 American Society of Clinical Oncology.)

FDG can also be used to detect a functional response after a treatment with anticancer agents providing information on drug efficacy much earlier than, e.g., survival data of patients. In patients with gastrointestinal stromal tumors, a response as early as 24 hours can be observed after the first application of imatinib mesylate (Glivec), a tyrosine-kinase inhibitor used in the treatment of multiple cancers, see Figure 8.11.

FDG can also be applied to CNS studies and it has been shown that cocaine consumption reduces cerebral glucose metabolism in the brain. Based on that result it was speculated that FDG could be used as a surrogate marker for the treatment efficacy of cocaine addiction. Indeed, FDG-PET investigations revealed that the monoamine oxidase B inhibitor selegiline which is used as a pharmacological adjunct in the treatment of cocaine addiction, altered glucose metabolism in most brain regions.

8.9.2 [^{18}F]FLT

3′-Deoxy-3′-[^{18}F]fluorothymidine (FLT) is a substrate of the intracellular mammalian thymidine kinase which is part of the DNA synthesis machinery. FLT is trapped within the cells (after phosphorylation) at levels proportional to the thymidine kinase activity. FLT–PET is superior to FDG-PET for the imaging of changes in the proliferation rate after treatment with the anti-proliferative drug cisplatin.