

# Nuclear Medicine of Tomorrow

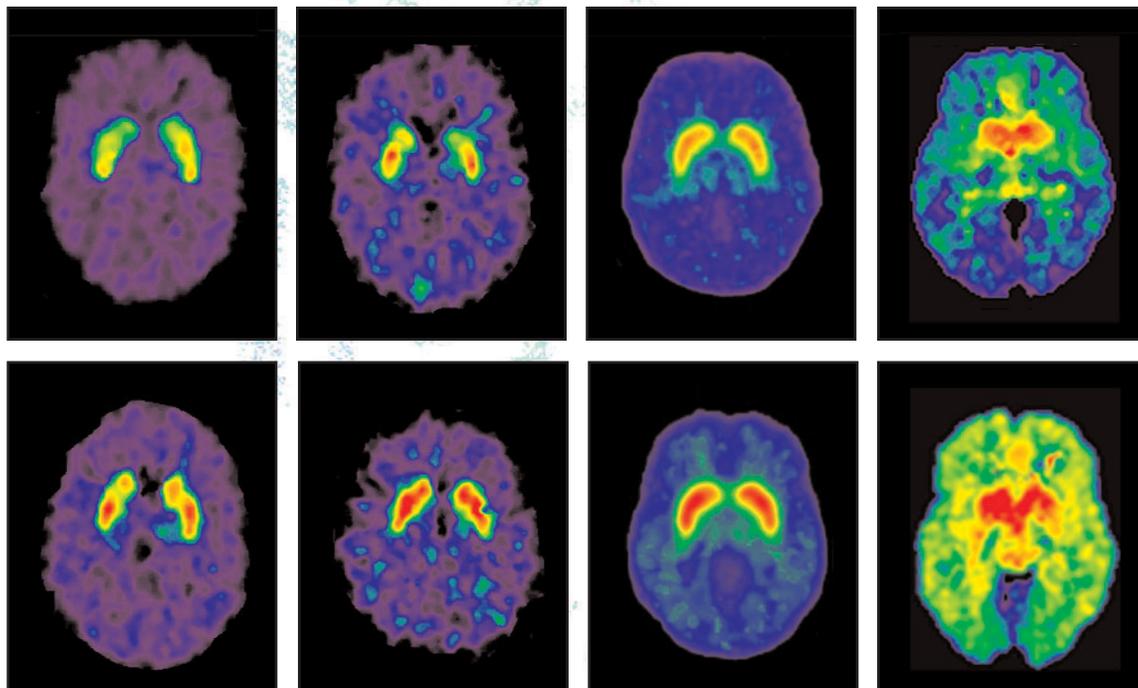


Cocaine abuse

Alcoholism

Obesity

Tobacco



With PET and SPECT imaging, scientists here make vital contributions to medical science's understanding of the molecular mechanisms of disease and the search for new treatments. Their current priorities for medical research focus on **drug addiction** and substance abuse, **aging** and **degenerative diseases**, and the biology of tumors that may lead to more effective cancer therapies.

PET brain scans reveal chemical differences in the brain between addicts and non-addicts. The normal images in the bottom row come from non-addicts; the abnormal images in the top row come from patients with addiction disorders. The PET scans from the cocaine abuser, the alcoholic, and the obese patient with food addiction show reduced levels of dopamine receptors (molecules that transmit pleasure signals in the brain). Low levels of dopamine receptors suggest an understimulated biochemical "reward system" in the brain. The PET scan from the cigarette smoker with nicotine addiction shows lower levels of monoamine oxidase (MAO), a brain enzyme that regulates dopamine levels. **BER** researchers are investigating pharmaceutical therapies for curbing or curing addictive behaviors.