Washington University in St. Louis
Office of Technology Management

PET RADIOTRACERS FOR IMAGING FREE RADICALS AND REACTIVE OXYGEN SPECIES (MATERIALS: WC-4-77)

Chu, Wenhua, Dugan, Laura, Mach, Robert, Mintun, Mark

Poranki, Deepika

T-009254

Many diseases can be associated with abnormal production of reactive oxygen species (ROS) due to oxidative stress. Currently there is no way to image this in situ. Dihydroethidium (DHE) naturally produces a fluorescent product when oxidized by an ROS. The signal is not strong enough for practical imaging purposes, and results in low spatial resolution. DHE that is not oxidized is rapidly cleared from the body, while DHE that is oxidized remains in the tissue longer. Therefore, DHE analogs that produce an enhanced fluorescent product, along with radiolabeled analogs for PET have been developed. The PET analogs also maintain their fluorescence properties. There are currently 4 fluorescent analogs and 4 PET analogs synthesized. From the current data, it appears that these analogs provide effective imaging of ROS, are selective for superoxide, and retain DHE-like activity.