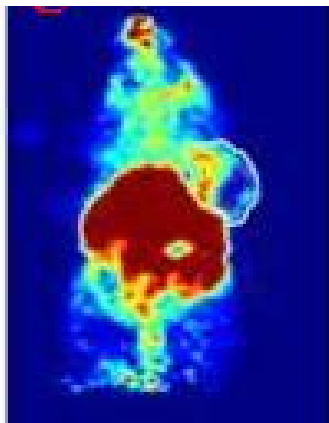


## The Role of Coordination Chemistry of Metallic Radionuclides in the Development of Diagnostic Imaging Agents



*A PET scan of  $^{64}\text{CuATSM}$  in a mouse model showing uptake in a xenografted hypoxic tumour on the right of the image. High uptake in the liver and intestines is also observed.*

There is an ever increasing demand in medicine for more specific imaging agents that can be used to assess disease in individual patients (personalised medicine) and to monitor treatment outcomes. Positron Emission Tomography (PET) is now recognised as a primary tool for cancer imaging and this lecture focuses on the development of complexes of the positron emitting radioisotope  $^{64}\text{Cu}$  for the specific imaging of hypoxia in tumours. After a brief introduction to PET imaging and hypoxia the chemical properties of some copper complexes of bis(thiosemicarbazones) will be discussed. Detailed understanding of the chemistry and electronic structures of the complexes has enabled the development of improved hypoxia selective imaging agents and has shed light on the mechanism for selectivity both *in vitro* and *in vivo*. This will be illustrated with data obtained from cell cultures and images obtained in animals. The way in which analogous coordination chemistry can be used to target other cancer specific receptors and to provide novel routes to purification will also be described.