



**Equipment/instrumentation:**

**PET** (positron emission tomography) and **SPECT** (single photon emission tomography) are nuclear imaging techniques that involve the use of radioisotope tracers which can probe disease specific biochemical processes, thus providing functional and metabolic information.

Radioisotopes that emit two high-energy photons upon decay are detected by PET scanners, while those emitting gamma rays can be detected via SPECT.

Most PET tracers have short half-lives and require an adjacent cyclotron (or, at least, in close proximity), while SPECT tracers are available in kit form and can be prepared as needed with longer half lives extending the imaging time window.

While PET and SPECT have limited spatial resolution, co-registration with CT provides high spatially resolved anatomical information, leading to better reconstruction of PET and SPECT images by improved attenuation and scatter correction.

**Triumph PET/CT (LabPet 4, X-O CT)** and **Explore SpecZT CT120** systems were purchased as part of an overall strategy to develop a pre-clinical *in vivo* imaging centre of excellence at UCD, which also includes the afore-mentioned IVIS optical imaging system, a micro-ultrasound device and an intravital microscope.

Triumph PET/CT (LabPet 4, X-O CT)	Explore SpecZT CT120
	
PET Spatial Resolution ~ 1-2.2mm CT 50-180µm	SPECT Spatial Resolution 1-3mm CT 25-80µm

**IVIS Spectrum Optical Imaging System**

In respect to the **IVIS Spectrum optical imaging system**, this device can image up to 5 mice simultaneously for bioluminescence/biofluorescence and can generate close to full tomographic reconstruction of the animal(s). As such, it provides an opportunity for large-scale *in vivo* studies.

