Appendix 1: Multiparametric Magnetic Resonance Imaging Protocol

IMAGING ACQUSITION:

MRI prostate imaging is acquired as per international guidelines specified by Prostate Imaging-Reporting and Data System, version 2.1 (PIRADS V2.1).

A multi-parametric MRI scan will be performed according to the following technical protocol, consistent with the highest standards of prostate MRI after appropriate bowel preparation (suggest Microlax suppository morning of diagnostic imaging) and buscopan or glucagon injection (where not contraindicated):

- 3-Tesla magnet field strength
- 32-channel cardiac coil, anteriorly and spinal coil posteriorly
- T2 sequences to show pathology, aid localisation of the lesion, and to fuse with ultrasound for those Urologists using co-registration biopsy method.
    - High resolution T2 FSE in 3 planes: axial, coronal and sagittal
    - 3D T2 sequence

Diffusion-Weighted Imaging (DWI) with software derived Apparent Diffusion Co-efficient (ADC) quantitative analysis maps, and multiple b-values (acquired b50, acquired b1400, calculated b2000);

Dynamic Contrast Enhanced imaging (DCE) 3D imaging, with IV gadolinium DTPA bolus determined by body weight, at 2.5ml/second followed by T1 DCE TRICKS (Time-Resolved Imaging of Contrast KineticS).

Analysis of DCEI according to PI-RADS DCEI analytic guidelines using PROCAD software

· No use of Endo-rectal coils or MR Spectroscopy as per current guidelines

· Approximate scan time 30 to 40 minutes

CONTRAINDICATIONS TO MRI

Patient with any contraindication to MRI will not undergo MRI. This includes, but not restricted, to pacemaker or other electronic implants, total hip joint replacement, known metal in the orbit, MR incompatible surgical or cerebral aneurysm clips, shrapnel, non-removable body piercings.

REPORTING OF MPMRI PROSTATE

The mpMRI will be reported by experienced subspecialist Radiologists according to the Prostate Imaging-Reporting and Data System, version 2.1, with each lesion categorised on a scale from 1 to 5.

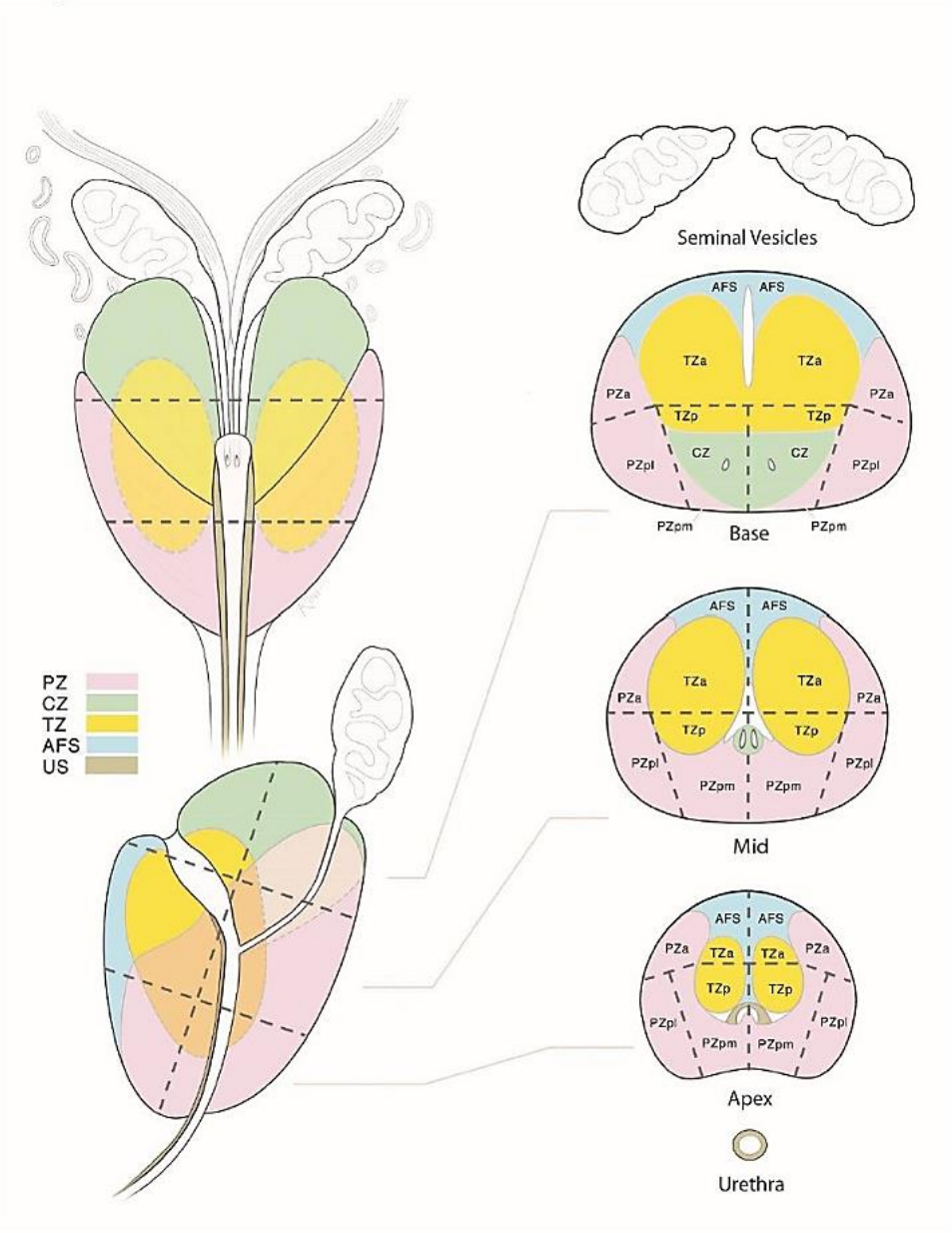
OPTIMIZATION OF CO-REGISTRATION BETWEEN MPMRI PROSTATE AND PSMA-PET/CT

To enable better co-registration of mpMRI to PSMA-PET/CT:

- option to use of suppositories to help eliminate gas/faeces from rectum
- ensure flat pelvis
- Use of structured knee bolster and strapping of feet to aid pelvic alignment

Appendix 2: Prostate Imaging-Reporting and Data System (version 2.1) Sector Map

Sector Map



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Appendix 3: 18F-DCFPyL PSMA administration and PET/CT Imaging Protocol

RADIOPHARMACEUTICAL

18F DCFPyL will be produced at Cyclotek (Aust) Pty Ltd under GMP Licence Number MI-12092005-LI-000904-2 and (parametric) release after certain quality control tests are performed and transported to the imaging site under regulatory criteria for dangerous goods. Cyclotek will provide the imaging site with a Quality Control Release notification form. Patients will complete the radiopharmaceutical consent form at their local site prior to injection.

18F-DCFPYL PSMA INJECTION DOSING AND ADMINISTRATION

Patients will be administered a single, intravenous 250MBq bolus dose of 18F-DCFPyL PSMA (acceptable: 200-300MBq depending on patient weight and activity provided on day of scan). The administered activity of 18F-DCFPyL PSMA is approximately 3MBq per kilogram body weight up to 350 maximum dose.

18F-PSR PET/CT imaging protocol for initial diagnosis/staging of Prostate Ca Imaging Protocol

Patient Preparation:

● No fasting required. (*Must be well hydrated, approximately 1-2 litres of plain water in the 2 hours before appointment.)

● The activity is administered intravenously through a cannula either utilising the automatic injector and a 100ml Saline bag or via hand injection through the cannula utilising the 5ml syringe shield and 2x10mls saline flushes.

● The dose pre and post syringe activities and times must be recorded to work out the exact administered activity for the injection time.

● Uptake Time: 120 minutes post 18F-DCFPyL injection. The patient is free to leave the department if they wish during this waiting time.

● Patient to void before the scan

SCANNER

Patients will be imaged on a GE Discovery 690 or 710 PET/CT (General Electric Medical Systems, Milwaukee, WI) combining a 64 slice multidetector CT scanner with a dedicated, full ring PET scanner with lutetium-based crystals.

Scan:

Scan range: Mid/Upper thighs to Lung Apices. Patient position supine, arms up and feet first to ensure bladder is in its emptiest state. CT scan acquired using a low-dose protocol (120/140 kVp and automatic exposure control ('Smart mA', max 200mA). Low-dose attenuation correction CT images were acquired and reconstructed to a 3.75mm slice thickness with an increment of 3.27mm using iterative reconstruction (50% ASiR). PET images were acquired at 3.5min/bed through the pelvis and 3.0min/bed to the lung apices. PET images were reconstructed from time of flight emission data using VUE Point FX and Q-Clear™ iterative technique with β value of 400. Q-Clear™ is a fully convergent reconstruction method which incorporates point spread function corrections, scatter correction and ULD-CT attenuation corrections. Sharp IR function was applied with no Z-axis filter. PET images were reconstructed on a 256 matrix.

PET/CT 18F-PSR <90kg 120min post injection

kV 120, Smart mA 200, noise index 30

3.5min over pelvis (2)

3.0min for rest of body (4)

Total: 6 beds ~ 19min

PET/CT 18F-PSR >90kg 120min post injection

kV 140, Smart mA 200, noise index 32

4.0min over pelvis (2)

3.5min for rest of body (4)

Total: 6 beds ~ 22min

Image Reconstruction: Images are reconstructed using the Q.Clear GE reconstruction method with a β value of 400.

Workstation used for scan interpretation: GE AW Server 3.2 Ext 1.0 or Inteleviewer.