



# THE ROADS BOTH TAKEN

## Dual Accreditation in Nuclear Medicine and Radiology

Text and photos by Dr Peh Wee Ming

### My beginnings...

Having spent four years in diagnostic radiology residency, deep within the dark corners of the west and away from people (as the running joke goes), my inner internist resurfaced and called me back to the wards. After some not-so-gentle cajoling by my friend and mentor Dr Khor Lih Kin, I decided to take the plunge and signed up for dual accreditation in radiology and nuclear medicine – then a new and relatively untrodden road with only three brave souls before me. In lieu of my fifth and final year in radiology, I crossed clusters to central Singapore to do two years of senior residency in nuclear medicine.

The practice of nuclear medicine is about the use of radioactive substances to diagnose and treat disease. It exists as a separate specialty from radiology and is often confused with sister specialty radiation oncology. Part of the confusion probably arose because half

of what we do – the half in diagnosis – is almost exactly like that of a radiologist, while the other half in therapy is akin to that of an internist physician or radiation oncologist. In fact, a second and historically dominant pathway into nuclear medicine training exists and leads from internal medicine.

### One half as clinician

Unbeknown to some, Singapore General Hospital (SGH) Nuclear Medicine sees a significant proportion of thyroid cancer and Graves' disease patients in Singapore for radioactive iodine (RAI) therapy. Armed with a measly year of HO-ship clinical experience, albeit one enhanced by toxic luck, I tried my best to be a physician again. This was not an easy transition. Instead of clearing scans and X-rays, I had to run full-day clinics. Scans do not holler at you after waiting for half an hour, while hyperthyroid patients (as any endocrinologist would attest to) do.

But this transition was made easier by the kindness of colleagues. I remember asking a senior, Dr Low Han Chung, to sit in my initial clinics to make sure I was not telling my patients nonsense. I remember the shining examples of classical internists like A/Prof David Ng and Dr Kelvin Loke, who showed me what it meant to do your best for patients. And of course, the sweet, sweet nurses who made everything better.

With time, I learnt to titrate thyroxine. I relearnt how to defuse explosive situations in clinic, how to feel necks and hard livers in the ward, how to convey the nuances of a single elevated cancer marker and how to hold the hand of a fellow human being to break bad news.

RAI has existed for decades and is the template "theranostic" compound – in the context of differentiated thyroid cancer, it tells you where the cancer is and treats it at the same time. This theranostic concept, a portmanteau of therapy and diagnostics, has become a buzzword in recent years and it is finding expanded scope in other cancers, eg, peptide receptor radionuclide therapy (PRRT) in neuroendocrine tumours and prostate-specific membrane antigen (PSMA) therapy in prostate cancer. These services at the cutting-edge have been started in SGH Nuclear Medicine and have injected a new vitality into the clinical practice. The potential for more receptors to target and more cancers to treat is compelling and awaiting realisation by the plucky.

### One half as imager

The other part of nuclear medicine in imaging has many similarities to that of



diagnostic radiology. I often tell medical students that five main tools exist in the imaging toolbox: X-ray and related techniques, CT scan, ultrasound, MRI scan and nuclear medicine. In essence, the joy of the diagnostic imager is the same joy of diagnosis shared by the rest of medicine. Instead of using open ears and a patient heart to hunt for clues in the history, we use our eyes to look for clinical meaning on stacks of pictures.

Running the operations of the imaging service is common to the practice of both nuclear medicine and diagnostic radiology, and is a less visible aspect of our daily routine. We work closely with allied health professionals – nuclear medicine technologists, medical physicists and radiochemists – to acquire the best images and deliver radiopharmaceuticals safely.

Also common to all imaging services is the need for close communication with the rest of the clinical specialties. The parable of the blind men trying to identify an elephant is central to all aspects of the medical craft. Communication of what we know from our respective vantage points is required to approximate truth in each patient.

The classical dichotomy of nuclear medicine is that it images functional processes, as opposed to the structural detail yielded by the other radiologic modalities. This is a division that will likely blur both ways in the foreseeable future, as newer positron-emission tomography (PET) scanners yield improved spatial resolution and the other radiologic modalities gain improved functional capabilities.

Another dichotomy that arose in my training, one that was slightly jarring, coming from radiology, was that nuclear medicine imaging was an eclectic blend

of the very old and very new. For instance, there is deep knowledge hidden behind the humble bone scan, stored in tomes and journals from the 1980s. On the other hand, the new PET tracers coming into mainstream use carry with them a rapidly metamorphosing body of knowledge. As illustration of the currency expected of us, my programme director and mentor Dr Winnie Lam would regularly quote papers hot off the press in her presentations. These new tracers have the potential to image hitherto inaccessible problems plaguing humanity (eg, in the field of dementia, we may one day image in vivo the key pathogenetic proteins of all major syndromes).

The depth of the nuclear medicine kung fu has also been far more profound than I had expected, with the fundamentals drawing from different branches of the basic sciences compared with radiology. Knowledge of how the tracers are chemically synthesised, how they move within the body, how they bind to target receptors, and how the receptors are normally expressed, are required for proper interpretation of the scan images.

### The yin and yang – coming together

Just as PET-CT is a hybrid imaging option whose whole is more than the sum of its parts, I have found that this path of dual accreditation has been complementary to both my radiologist and nuclear medicine physician selves. On one hand, PET-CT is like radiology with cheat code on, highlighting morphologically subtle and barely perceptible lesions in brilliant hues of red. On the other, the specificity of the structural findings limits the false-positives that come with imaging ubiquitous biological processes.

The added perspective is a means of immediate feedback for personal growth.

And of course, the great theranostic promise is that what we can see, we can also solve. How far this promise goes and how much of it can be applied to our Hippocratic Oaths, can be limited only by our imagination.

I am glad to be walking both roads in this yellow wood, even though it is a journey without end. ♦

#### Legend

1. Society of Nuclear Medicine & Molecular Imaging's Image of the Year 2018. Paired pre- and post-PSMA therapy scans showing marked imaging and prostate-specific antigen response in metastatic castration-resistant prostate cancer patients who have failed standard therapy
2. Simulated clinic encounter featuring fellow colleagues on the dual-accreditation pathway, Dr Gideon Ooi (left) and Dr Lenith Cheng (right)
3. Mini department lunch outing with rotating radiology residents of the SGH Department of Nuclear Medicine and Molecular Imaging

Title image and permission obtained from Prof Michael Hofman, Centre for Molecular Imaging, Peter MacCallum Cancer Centre, Australia

Dr Peh is currently an associate consultant with National University Hospital's (NUH) Department of Diagnostic Imaging, nuclear medicine section. He serves on several tumour boards and contributes to the diagnostic neuroradiology and nuclear cardiology services. He was formerly chief resident, NUH Diagnostic Radiology.

