FROM BENCH TO BEDSIDE

A personal journey and some hints and suggestions....
IN THE BEGINNING...
ANTIBODY SALES AND TRANSLATION

• RPMS Endocrine Unit at Hammersmith Hospital
• Lack of funding for conference travel led to first enterprise
• Close relationship between research and hospital allowed access to patients and clinicians
• Bedside-research-translation-bedside
MY PATH WAS UNUSUAL....

PhD Royal Postgraduate Medical School (London) - part time, while establishing radioimmunoassays and running lab to assay samples for UK supra-regional Assay Service

Field of study - calcium hormones, bone; then discovered ectopic hormone production by cancer cells, which led to diagnostics to monitor therapy

Tenured early and went on short sabbaticals for experience - Paris, Athens and later, Melbourne
OUR FIRST ENTERPRISE

• Radioimmunoassays developed for calcitonin and PTH using rabbit antibodies and 25OH vitamin D, using chickens.
• Established company
• Spent weekends in lab ampouling and freeze drying
• Sold excess antibodies to distributor to fund conference attendance for staff and myself
• Became more innovative in looking for funding
From bedside  To research  Translation to bedside
TRANSLATION- SURGICAL PLANNING FOR THYROID AND PARATHYROID TUMOURS

• Using assays developed for PTH and calcitonin
• Catheter with radio-opaque tip inserted in Cath Lab and threaded up to thyroid/parathyroid area in neck
• Samples taken at various sites to identify the site of the tumour and look for local metastatic spread
• Provided results to surgeons to aid surgery
• Collected tumour samples for research use, after pathology requirements satisfied
• Invited to attend surgery in several hospitals in England and Wales
Patient with medullary thyroid tumour

Reaction to whisky

Developed test as a result..

**THE WHISKY TEST**

**ABSTRACT**

Oral whisky is a potent stimulus of calcitonin secretion. Peak increments of 50 ng of calcitonin are observed within 15 min after the ingestion observed during a four-hour calcium infusion. This procedure has several patients at risk of developing medullary carcinomas of the thyroid, and miosis.

**WHISKY: A NEW PROVOCATIVE TEST FOR CALCITONIN SECRETION**

By John F. Dymaling, Otto Ljungberg, Carmel J. Hillyard, Peter B. Greenberg, Imogen M. A. Evans and Iain MacIntyre

**INTRODUCTION**

Medullary thyroid carcinoma (MTC) is a tumour of the calcitonin-secreting parafollicular C cells of the thyroid gland. It is usually diagnosed in children or young adults, and is more common in families with a history of multiple endocrine neoplasia syndrome (MEN). MTC is an aggressive neoplasm that can metastasize to the bone, lungs, and liver.

**METHODS**

Patients with MEN were divided into two groups: group A had MEN without MTC, and group B had MEN with MTC. Both groups were given a standard dose of calcitonin (VT21) and calcitonin was measured in plasma before and 10 min after the injection.

**RESULTS**

Calcitonin levels were significantly higher in patients with MTC than in those without MTC. The difference was statistically significant, with a p-value of 0.001. The results were consistent across all groups.

**DISCUSSION**

These findings support the hypothesis that calcitonin is a marker for MTC and may be useful in the early detection and monitoring of the disease. Further studies are needed to confirm these findings and to evaluate the potential use of calcitonin as a diagnostic tool.

**REFERENCES**


**FAMILIAL MEDULLARY THYROID CARCINOMA**


**ACKNOWLEDGEMENTS**

This study was supported by grants from the Cancer Research Campaign and the Medical Research Council.
ECTOPIC HORMONE PRODUCTION

• Working on medullary thyroid carcinoma
• Serendipitous discovery, when testing “control” samples from patients with non-thyroid tumours
• Followed up with larger trial
• Obtained grant funding
SOME HIGHLIGHTS….

- Discovery of ectopic calcitonin production in non thyroid tumours and leukaemias
- Developed assay for a new hormone from calcitonin gene
AND LOWLIGHTS.....

• Discovery of ectopic hormone production by solid tumours—professor decided to change author order to promote clinician who took some of blood samples

• We retracted Katacalcin discovery when we could not repeat results—however...years later I reviewed a paper in Australia ...authors discovered that we were right ...just needed longer time for bioassay!
OF COURSE, REGULATIONS AND PRIVACY ISSUES WERE EASIER THEN…

• Trained by the hospital to take blood from patients
• Assisted specialist clinician in clinics—usually when patients came for radiation planning
  • Took histories relevant to the project
  • Discussed research projects and implications and obtained informed consent
• Developed rapport with clinicians and patients
MONITORING PATIENTS

- Lung cancer study - using whisky
- Leukaemia monitoring
- Medullary thyroid carcinoma - family studies
TRANSLATION LEARNINGS

01 Vision to do research that will benefit patients

02 Collaborate! Work with end users - clinicians and patients from the outset

03 Need to “do deals” to get things done

04 “Nothing is impossible” attitude

05 Be cheeky and ask
   • for funding
   • for clinical samples or collaboration

06 The most enduring collaborations started in the Doctor’s Club
INTRODUCTION TO COMMERCIAL RESEARCH

• Joined entrepreneurial team at RPMS extracting calcitonin from dogfish
• Initially a huge delivery
• Then trained fishermen at Lowestoft to remove the ultimobranchial glands
• Characterised molecule
• Bioassays showed greater potency than human calcitonin
• Licensed to Ciba Geigy for treatment of Paget’s disease
COMMERCIALISATION

• The one the Advisory Board said couldn’t work….SimpliRED technology

• Collaboration with Bruce Kemp at Repatriation Hospital, Heidelberg

• Led to two minute tests for:
  • D Dimer
  • HIV
  • Hepatitis B
  • Heartworm
  • FIV

• Licence to Abbott

IP AND PATENTS

- Not all IP can be patented
- Rule of thumb “if you can’t police invention, keep it secret”
- Software and Apps are hard to patent
  - First to market advantage needs capital and nimble, responsive development
MANY COMMERCIALISABLE IDEAS IN HEALTHCARE

• Often ideas from the coalface to enable better patient care or more efficient practices
• Surgeons and nurses seem to be particularly innovative
• Hospitals are ideal environment to test ideas with other users
• Obtain “customer” feedback very early in process
• Interesting to investors and incubators
FINDING AN INVESTOR

• Understand the various requirements and funding criteria for partners and investors
• Understand the market for your product
• Develop active relationships with pharmaceutical companies and potential investors
• Protect IP
• Make sure presentations and documents are factual, realistic and defensible – always keep copies
FUNDING YOUR IDEAS

• State governments provide collaborative funding and grants for commercialising ideas
  • E.g. Advance Queensland initiatives

• Commercialisation Australia provides assistance for commercialisation including to university commercialisation companies

• Incubators and accelerators provide small grants, education and mentoring
  • Most suited to Healthtech, not drug development
YOUR INSTITUTE’S COMMERCIALISATION COMPANY WILL BE ABLE TO HELP WITH:

- IP protection and advice
- Help with establishing a company
- Incubation in-house or introductions to incubators
- Introductions to pharmaceutical, device and diagnostics multinationals
- Licensing
COMMERCIALISATION LEARNINGS

01 Publications can be as important to pharma as patents

02 Work with your institute commercialisation company

03 Make your own industry contacts at conferences

04 "Nothing is impossible" attitude

05 Concise but enthusiastic presentations in plain English

06 Elevator pitch that the whole team uses to describe the idea/invention
COME TO THE NEXT HEALTHTECH MEETUP!

Wednesday, June 20, 2018
5:30 PM to 8:00 PM

The Precinct - TCB
Lvl 2, 315 Brunswick Street Fortitude Valley
Brisbane
THANK YOU