Recipe For A Good Collaboration

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recipe \[ˈrɛsɪpi\]

- a set of instructions for preparing a particular dish, including a list of the ingredients required
- something which is likely to lead to a particular outcome

No-bake?
collaboration [kələbəˈreɪʃn]

- the action of working with someone to produce something
- traitorous cooperation with an enemy
Ingredients for Success

- Knowing *when* and *whom* to partner
- Internal champion/point-of-contact (preferably based locally)
- Skin in the game
- Tenacity & resourcefulness
- Constructive skepticism
- Project management
- Transparency & good faith…

Leave your ego at the door
... for Disaster (worst case trajectory)

- A paradoxical fear of success
- A paradoxical funding situation
Diagnostic Imaging – *in vivo* and real-time

**OLD WORLD**

Antibodies are used to detect / characterise important targets in tissue and blood specimens *ex-vivo*

A pancreatic cancer biopsy specimen “stained” with an antibody

**NEW WORLD**

… to radiolabeled mAb fragments and *in vivo* diagnostic imaging with **Positron Emission Tomography** (PET)

From antibodies and *in vitro* immunohistochemistry …
Centre for Translational Molecular Imaging

CTMI serves as a platform to generate high quality \textit{in vivo} data research capabilities in Singapore universities and research institutes. This facility opens up \textit{in vivo} targeted molecular imaging opportunities for scientists in Singapore.

The laboratory is accessible to industry and academic collaborators with the objective of developing precision medicine strategies to impact healthcare.
CTMI supports drug development processes using *in vivo* imaging to evaluate:

- *In vivo* biodistribution studies
  - Receptor occupancy / distribution / density studies
  - Drug pharmacokinetics
  - Therapy efficacy (longitudinal intra-animal)
  - Biosynthesis / Metabolism / Stability
- Novel tracer evaluation
- *In vivo* disease model characterisation
Capabilities

- *In vitro* assay development (FACS; Radio-immunoassay)
- Imaging probe development and analysis (Chemistry and HPLC)
- *In vivo* model development (cell banking/tumour growth kinetics)
- *In vivo* PK/biodistribution and imaging (Gamma Counter; PET/X-Ray; CellVizio; IVIS Xenogen)
Case study:

*In Vivo* Validation of Antibody Fragments against Receptor X using Multi-Modality Imaging

*In vitro* target validation – biological relevance and clinical acceptance
- Characterisation and selection of cell lines (controls!) for binding assays
- Selection/Generation of antibodies
- Development of imaging probes

Selection/Generation of antibodies

*In vivo* validation
- Development, characterisation and selection of relevant mouse models (controls!)
- Selection of imaging modality
- Generation of antibody fragment (repeat *in vitro* validation of binding)
Work Flow

1. **Ligand/Precursor** → Radiolabeling → **Radioligand**
2. **Systemic Injection**
3. **Target Cell**
4. **Small Animal PET/SPECT Imaging**
5. **Clinical Nuclear Imaging Probe Distribution**

Image courtesy of Dr. Ann-Marie Chacko
About ImaginAb

- UCLA / City of Hope spin-out (October 2007)
- Primary focus: cancer & immunology
- ~50 employees – Los Angeles, Singapore, Tokyo
- 30 collaborations with global pharma
- Clinical stage: Phase II
- Early revenues
- Significant IP
- ~S$60 million raised to date
ImaginAb Core Technology

Engineered Antibodies for Accelerated Kinetics

Intact Antibody
150 kDa

Minibody
80 kDa

Cys-Diabody
55 kDa

Preserving Affinity…

• 7-10+ days for adequate blood clearance to see small signal
• Hepatic clearance (masks disease until fully cleared)

• Same or next day imaging / targeting
• Hepatic clearance

• Imaging at 2-4 hrs post injection
• Renal clearance: keeps upper abdomen clear
ImaginAb’s PSMA PET Scan

The new Standard for Imaging of Prostate Cancer

Bone Scan  FDG PET scan  PSMA PET Scan

Liver  Brain  Liver
Kidneys  Bladder  Kidneys  Bowel Excretion

If we can see cancer, we can manage it better…

In conjunction with Memorial Sloan Kettering Cancer Center.

*Same patient for all scans in the same week