Biobanking: how it works and why it is important?

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TBTC Nurse & AHP Study Day, Birmingham 19th May 2017
Running order

• Why biobank?

• Biobanking models?

• Requirements for a biobank

• How we do it in Liverpool

• Future of biobanking in the UK
1. Why biobank?
Patient’s perspective

• Most prevalent solid tumour in children
• Commonest cause of cancer death in children
• 1/3 cancer patients develop brain mets

• 3rd leading cause of cancer-related death among men between 15 – 54 years
• 4th leading cause of cancer-related death among women between 15 – 34 years
Patient experience of biobanking and the value of research

• My personal experience was brilliant, but I had no prior knowledge

• We’re none of us as smart as all of us

• Important to understand and respect everyone’s areas of expertise

• Patients want to be involved but it needs to be managed

• Raising awareness is important
“Tissue is the issue”
Human samples in research

• Patients know their samples are important but don't have enough information

• They understand the need to link symptoms to the disease process

• They understand the need to be able to predict the effects of new treatments

• Patients can be a big driver in ensuring their tissue is collected
But limited clinical annotation

How relevant are the results to routine clinical practice?
Beyond genomic - the other ‘omics’

Genomics  |  Proteomics  |  Metabolomics

All depend on high quality annotated human biospecimens
Validation (independent data set)

Patient/Clinic

Discovery

Biobank

Translation
2. Biobanking models

Single national biobank

-versus-

Network of biobanks
The CCLG Tissue Bank is the UK’s largest unique collection of tumour, DNA and other tissue samples from childhood cancer patients.
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Paeds brain tumours: 400 new cases / year
Full clinical annotation and samples <100% complete
BRAIN UK is a collaboration between 26 NHS Neuropathology Centres across the UK, giving effective coverage of 90% of UK population. The British Neuropathological Society, British Neuro-oncology Society, Brain Tumour Network, Medical Research Council and National Cancer Research Institute Brain Tumour Clinical Studies Group have provided input into and support for the project.
Adult primary brain tumours: ~10,500 new cases / year

Adult metastases: ~27,000 new cases / year

No / basic clinical annotation!
3. Resources for biobanking
Patient
Neuropathologist
• Laboratory staff
• Hardware & consumables
  • (from routine NHS resources!)
• Top tumour nurses!
• The essential paperwork

- Ethics approval / Informed consent
- Anonymised data
- Disclose that discovery may have commercial value
- Disclose academic and commercial partners
- Governance structure / oversight
- Tissue quality assurance
4. Biobanking in Liverpool

• 1995 – 2010:
  – Project specific ethical approval
  – New ethics for every new project
  – Time consuming
  – Could only target eligible patients for collection
  – Missed opportunity to collect samples from
    - rare brain tumours e.g. pineal
    - AND common tumours e.g. meningioma!
Patient Information Sheet for tumour and non-tumour sample donation

Nervous System Tissue and/or Blood Collections for Research
Walton Research Tissue Bank

Name of Researchers: Mr A Brodbelt, Mr M Jenkinson, Ms C Gilkes, other Walton Centre Consultant Neurosurgeons, Dr D Crooks, Dr B Haylock, Dr D Husband, Dr A Shenoy

We would like to invite you to take part in our research study. Before you decide we would like you to understand why the research is being done and what it would involve for you. One of our team will go through the information sheet with you and answer any questions you have. We'd suggest this should take about 30 minutes. Talk to others about the study if you wish. Ask us if there is anything that is not clear.
Patient in pre-surgery clinic

Consented for Tissue Bank

Associated Clinical data
- Frozen tissue
- Fixed tissue
- Cell cultures

Clinical details
- Questionnaires
- Imaging data
- Path Reports

Complete Sample Set
- Serum
- Plasma
- Cell fraction

Embed biobanking within the clinical service
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<th>Tumour type</th>
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WRTB Recruitment (Jan-Dec 2016)

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<td>Total Blood samples</td>
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**Samples released**

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<td>Tissue samples released</td>
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<td>Blood samples released</td>
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## WRTB projects supported

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<th>2011</th>
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<td>Total Projects (2011-2016)</td>
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<td>Total Ongoing/Active Projects</td>
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<table>
<thead>
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<td>Others</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>31</strong></td>
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| BRAIN UK Projects              | 3     |
Patients feel biobanks have a duty to make sure the tissue they donate is used for research
Linking to existing data sets

- Biobanks are resource intensive
- Can we link tissue to existing data sets?
  - E.g. National Cancer Registry
- Can patients contribute to their own data sets?
  - E.g. online repositories
- Can AHPs promote biobanking / contribute to data collection?
Advanced biobanking initiatives

• Multiples samples for intratumoural heterogeneity

• Longitudinal samples for evolutionary biology
  – primary and recurrent glioma
  – low to high grade transformation

• Paired samples from metastases for clonal evolution
Prospective study of leading edge

Using ADC Maps with Structural Scans to Improve Intraoperative Biopsy Specimens in Brain Metastases

RASHEED ZAKARIA, MICHAEL D. JENKINSON
Scientific meritocracy

• Fully annotated samples are a valuable resource

• Access to high quantity of brain tumour tissue is competitive

• Samples should go to the best research project
Improved networking

- Existing prospective biobanks
- Standardise SOPs
- Set targets for tumour types and samples
- Align collection to scientific questions
6. Conclusions

• Patients value the opportunity to contribute

• Collaborative working (clinic + science=translational)

• Tumour biology / Identifying new targets for therapy

• Future patient benefit
7. Acknowledgements / Collaborations

**Tumour CNS**
- Jan Holding
- Toni Thorpe
- Helen Moore
- Alison Rodway
- Anna Crofton

**Trainees**
- Rasheed Zakaria
- David GIraldi

**Neuropathology lab**
- Khaja Syed (WRTB)
- Nitika Rathi
- Neil Moxham
- Carrie Chadwick
- Wallis Simpson-Hayes
- Amanda Davies

**Consultants**
- Andrew Brodbelt
- David Lawson
- E Chavredakis
- Paul Eldridge
- Jibril Farah
- Katie Gilkes
- Anna Visca

**Neuroradiology**
- Kumar Das
- Maneesh Bhojak
- Samantha Mills