

Indian Biobanks : Concepts and Prospects

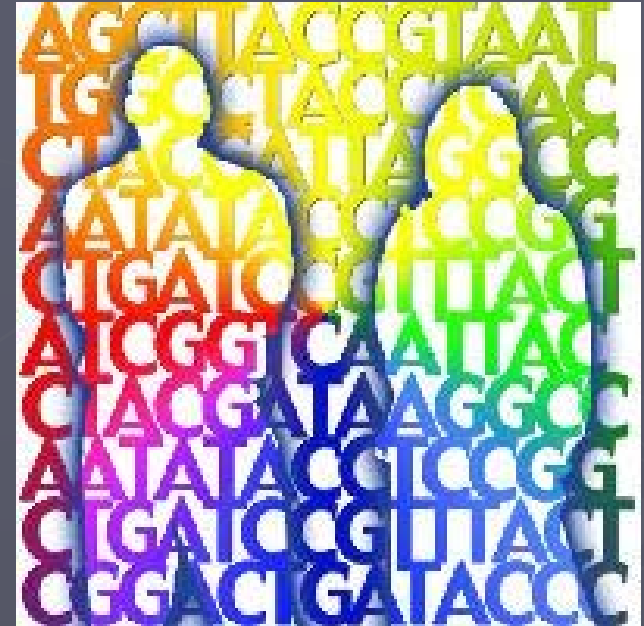
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What is a Biobank ?

- ▶ A Biobank is a **depository for biomaterials** from a representative portion of a human population.
- ▶ The Biobank acts as a **vault with intricate detailed information** pertaining to the individuals from whom biological materials have been collected.
- ▶ **Data collection** and proper **cataloging** are essential components for the success of a Biobank.



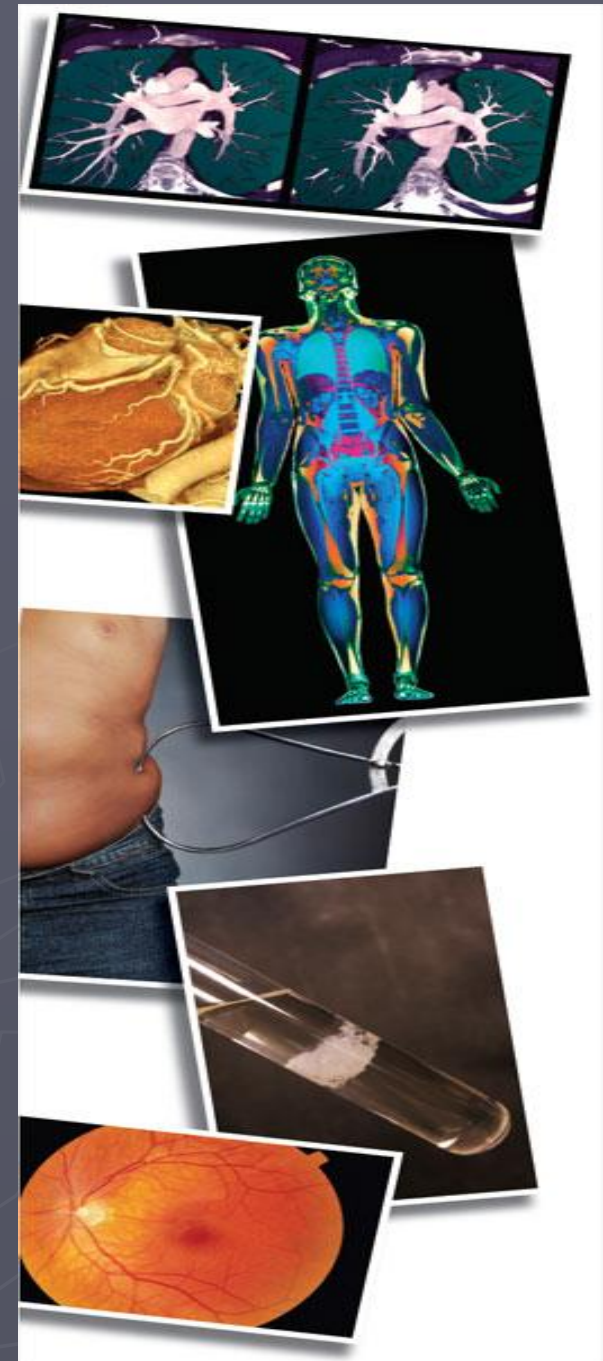
Types of Biobanks

- ▶ **Tissue bank** – (i) Surgical tissues, (ii) Transplant tissues
- ▶ **Cancer / Tumor bank**
- ▶ **Cord blood / Stem cell bank**
- ▶ **Blood bank** – Dried Blood Spots
- ▶ **Body fluids** – (i) Synovial, (ii) Urine, (iii) Sputum, (iv) Buccal scrapings, (v) Sperm
- ▶ **DNA / RNA bank**
- ▶ **Cornea bank**



Functional Divisions of a Biobank

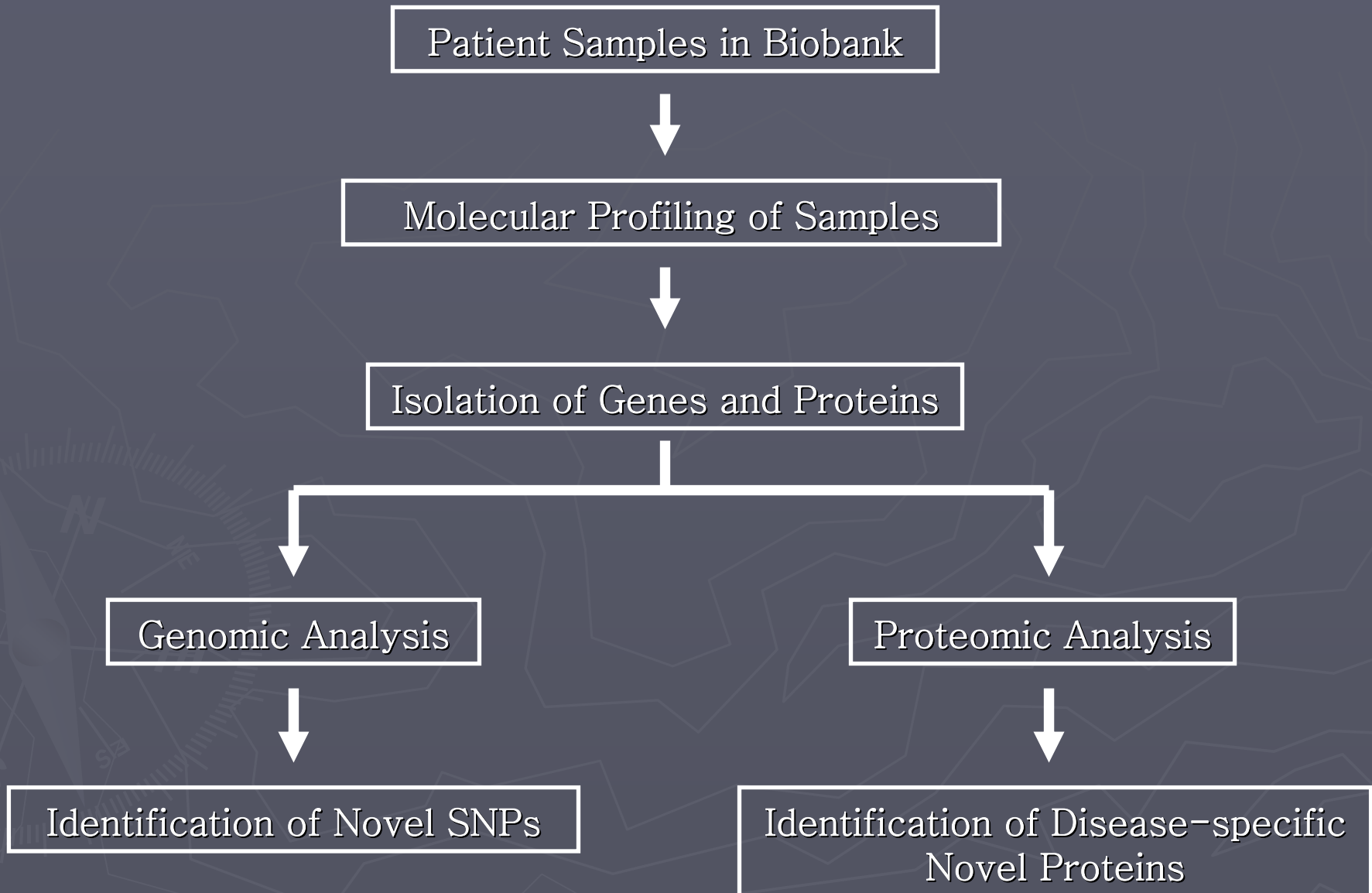
- ▶ Cell and Molecular Biology
- ▶ Blood Center
- ▶ Pathology
- ▶ Genetics
- ▶ Bioengineering
- ▶ Cryobiology
- ▶ Bioinformatics
- ▶ Ethics



Utilities of a Biobank

- ▶ **Routine work** – health centers, hospitals, blood transfusion centers and Public / Private pathological laboratories.
- ▶ **Research work** – biomedical experiments for a particular disease in a specific population.
- ▶ **Epidemiological work** – monitoring in susceptible populations after disease outbreak, poisoning and / or pollution.

Biobanks to Aid Research



Biobanks :

Ethical / Safety Issues

- ▶ For tissue banking, freely given **informed patient consent** is mandatory.
- ▶ Patient consent forms needs to be upgraded from time-to-time following IRB regulations.
- ▶ **Model Consent Form : University Hospital Aintree, Liverpool, U.K.**
- ▶ **Confidentiality – very important !**
- ▶ **QA and QC checks necessary** right from planning, implementation, up to documentation and analysis.
- ▶ **Safety is crucial** : MSDS to be distributed among staff for entire chemical compounds kept at the biobank.



SOME OF THE WORLD'S LARGEST BIOBANKS

UK Biobank

Blood Urine Saliva

Goal: 500,000

Status: 100,000

Any other comments:

Recruits only adults aged 40-69. Planned completion by 2010.

Cost: **\$122 MILLION**

LifeGene (Sweden)

Blood Urine Saliva

Goal: 500,000

Status: Planning stage

Any other comments:

Pilot study planned for 2009.

Cost: **\$169 MILLION**

Kadoorie Study of Chronic Disease (China)

Blood Urine Saliva

Goal: 500,000

Status: 480,000

Any other comments:

Aims to study genetic and environmental factors including smoking and premature death.

Cost: **UNAVAILABLE**

Children's Hospital of Philadelphia

Blood Urine Saliva

Goal: 100,000

Status: 48,000

Any other comments:

Follow-up of medical records via hospital's integrated databases. Status includes 35,000 children.

Cost: **\$60 MILLION**

Estonian Genome Project

Blood Urine Saliva

Goal: 100,000

Status: 17,000

Any other comments:

Project stalled for several years. Recruitment has restarted under government control.

Cost: **\$20 MILLION**

Joondalup Family Health Study (Australia)

Blood Urine Saliva

Goal: 80,000

Status: Recruiting

Any other comments:

Measures as many as 3,500 traits. Cost is for first 3 years only.

Cost: **\$140 MILLION**

All costs are in US dollars.

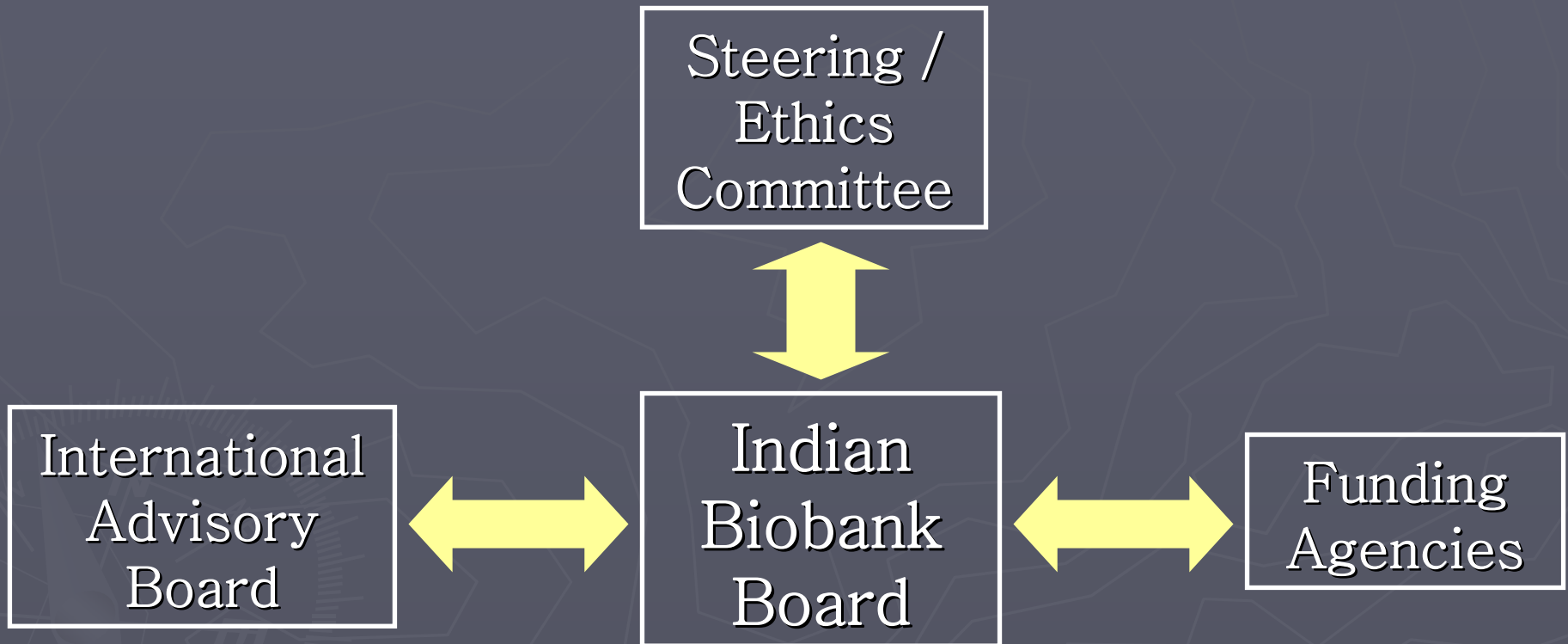
THE UNIVERSITY OF TEXAS
MD ANDERSON
CANCER CENTER

Making Cancer History[®]



- **The MD Anderson Cancer Center is an example of a model Tumor Biobank.**
- **India can follow the MD Anderson model to start cancer tissue repositories in various cancer hospitals.**

Concept of an Indian Biobank



MANAGEMENT & GOVERNANCE :

Clinicians, Geneticists, Lawyers, Basic Scientists, Sociologists, Epidemiologists, Statisticians, Ethicists

Biobanks in India



NIMHANS, Bangalore

Brain Biobank



ACTREC, Mumbai

Cancer Biobank

Repositories in India



Organ Retrieval Banking
Organization (ORBO),
AIIMS, New Delhi



National Repository for
Cell Lines / Hybridomas,
NCCS, Pune



Mycobacterial Repository,
JALMA, Agra



Dried Blood Spots (DBS) : A Novel, Cost-Effective Alternative to Serum Samples



Health surveyor collecting a DBS sample in the field

- Cheap – per person cost 20 times lesser than UK biobank !
- Convenient for patient and collector.
- Patient Compliance – only 5% refusal as compared to 40% refusal for blood samples.
- Storage at room temperature.

India's Prospects

- ▶ India has a population of over a billion and is the world's largest democracy.
- ▶ India has a very high burden of both communicable and non-communicable diseases.
- ▶ India has the means to make a modest start towards establishing a Biobank.



Thank You !

