WP3 Biological Samples

Sue Ring

Closer KEW 16th January 2013

CHILDREN OF THE 90S

University of BRISTOL

Avon Longitudinal Study of Parents and Children

Supported by wellcome trust

MRC Medical Research Council

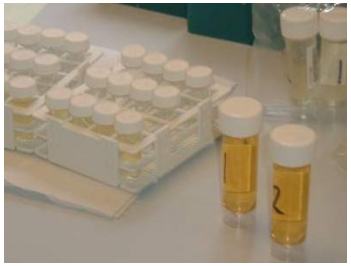
WP3

Harmonisation of strategies for analysing biological samples

- Biosamples
  - Sample collections
  - Data generated from samples
  - Future sample collections
- Cell lines
  - Use of cell line collections

closer
Cohort & Longitudinal Studies Enhancement Resources

Biological Samples



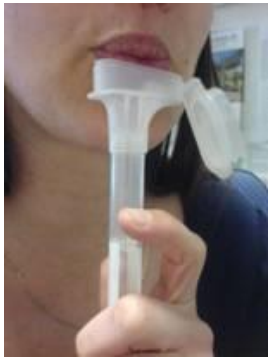
urine

hair

umbilical cord

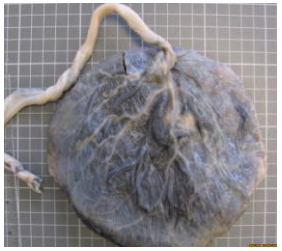
blood

milk teeth



saliva

toe nails



placentas

USE OF BLOOD SAMPLE

PLASMA

- Biomarkers
- Metabolomics
- Proteomics
- Environmental exposures

White cells

Cell lines

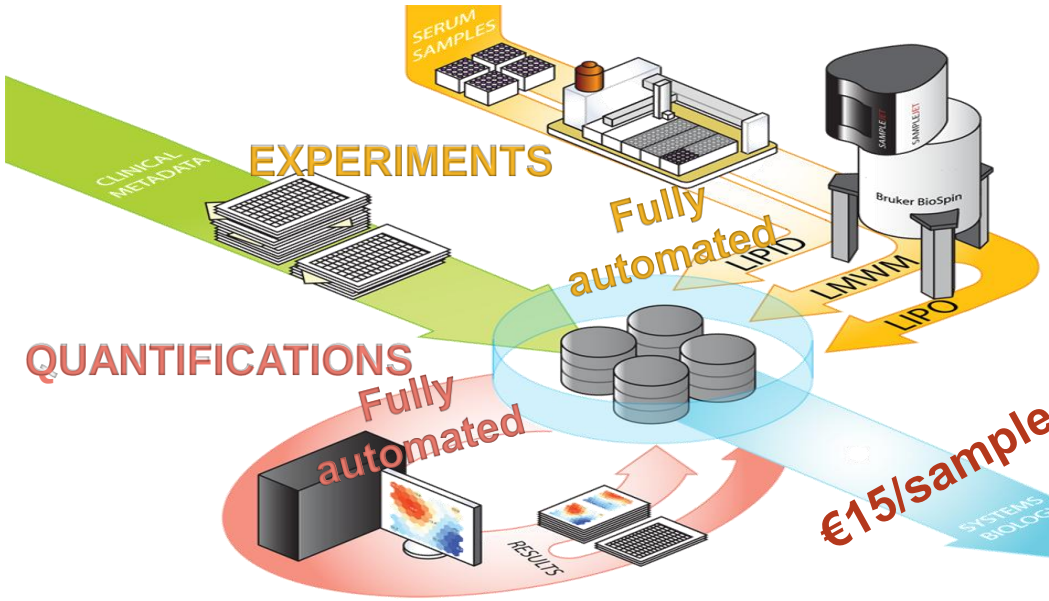
Induced Pluripotent Stem Cells (iPSCs)

DNA
RNA

- Genetics
- Gene Expression
- Epigenetics

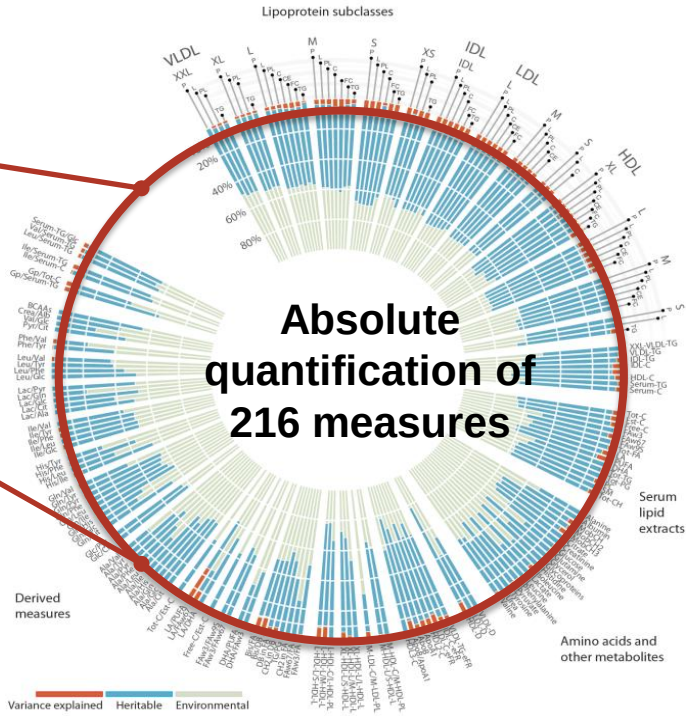
- Cellular assays
- Metabolomics
- Proteomics

Metabolomics - Mika Ala-Korpela



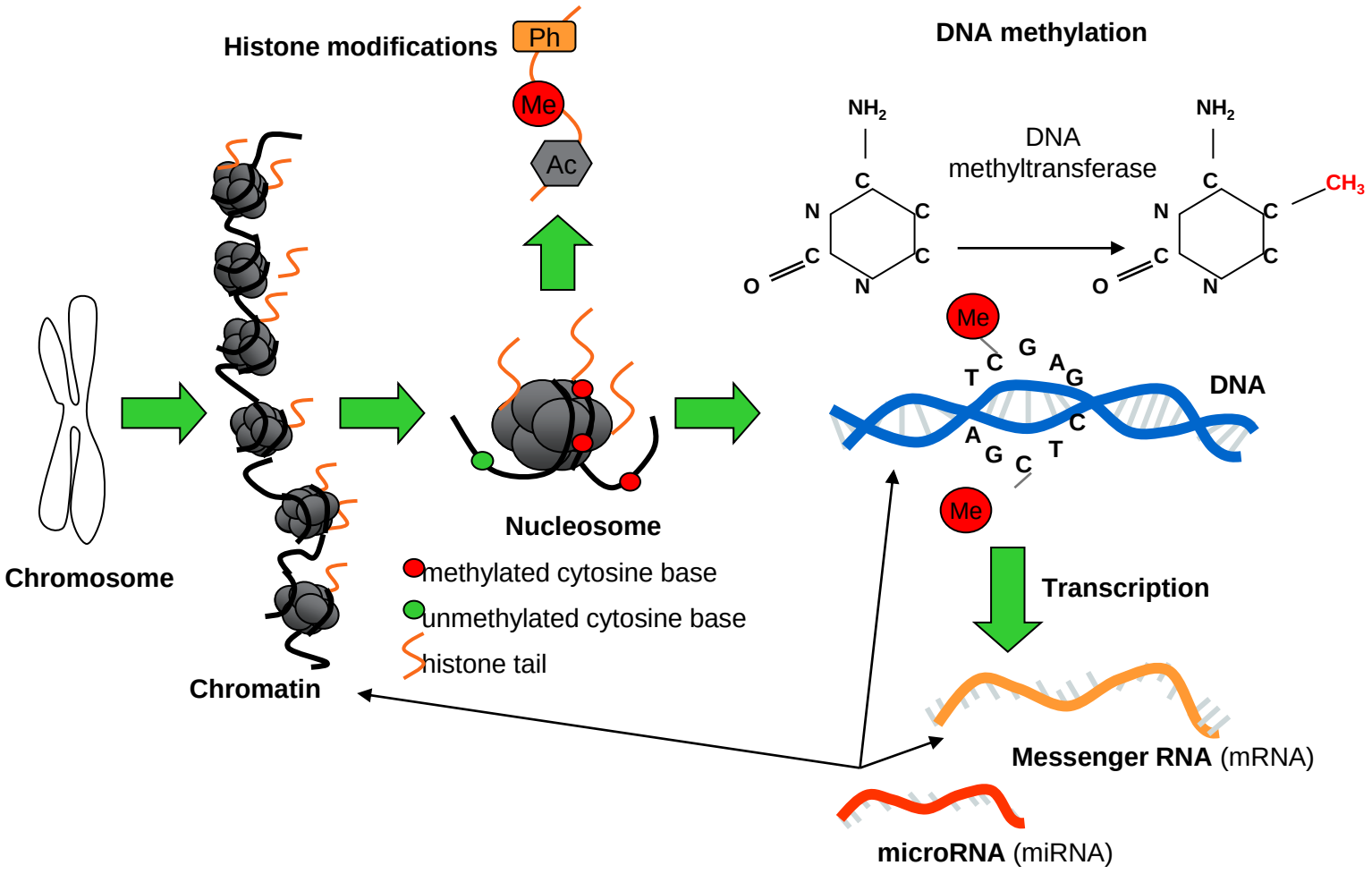
95,000 samples analysed
(1 spectrometer 3.5 y)

BBRC 375, 356, 2008
Analyst 134, 1781, 2009
Mol Syst Biol 6, 441, 2010
Nat Genet 43, 1131, 2011
Nat Genet 44, 269, 2012



Epigenetics

The heritable changes in gene expression that occur without changes in DNA sequence



Harmonisation Issues for blood Analysis

- Fasting or non fasting?

- Anticoagulant

- eg EDTA, heparin, clotted sample ?

- Time from collection to processing

- immediate or after transport?

- Storage

- how long? What temperature?

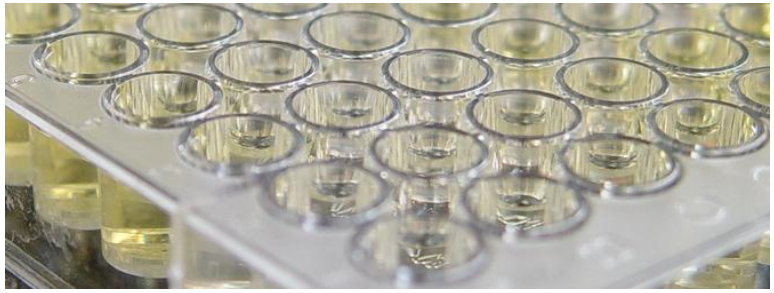
Harmonisation Issues for Analysis

eg cotinine

- Can be measured in plasma, saliva, urine, hair

- Various methods, qualitative and quantitative

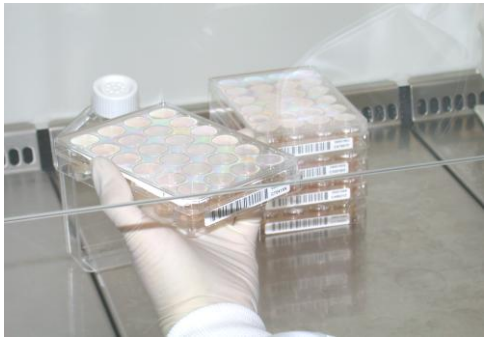
eg ELISA, HPLC



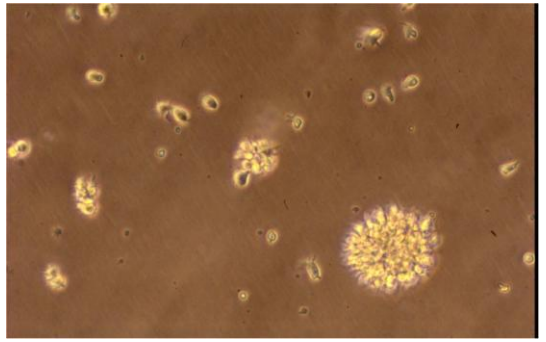
Cell line production

Peripheral Blood Lymphocytes (white blood cells) isolated from blood

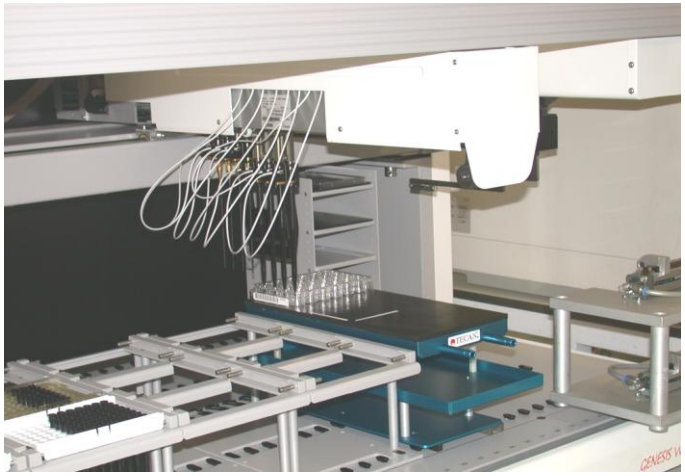
Add Epstein Barr Virus and put in solution containing sugars, protein and growth factors.



37°C
for 6 to 8
weeks



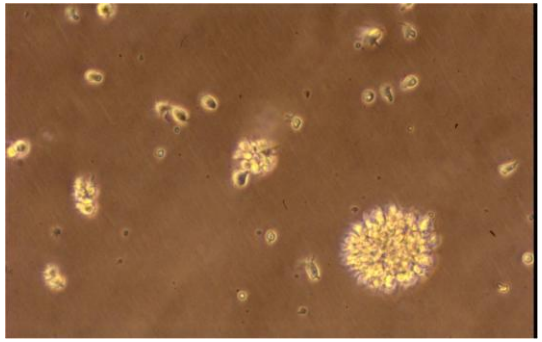
"feed" every
3 to 4 days

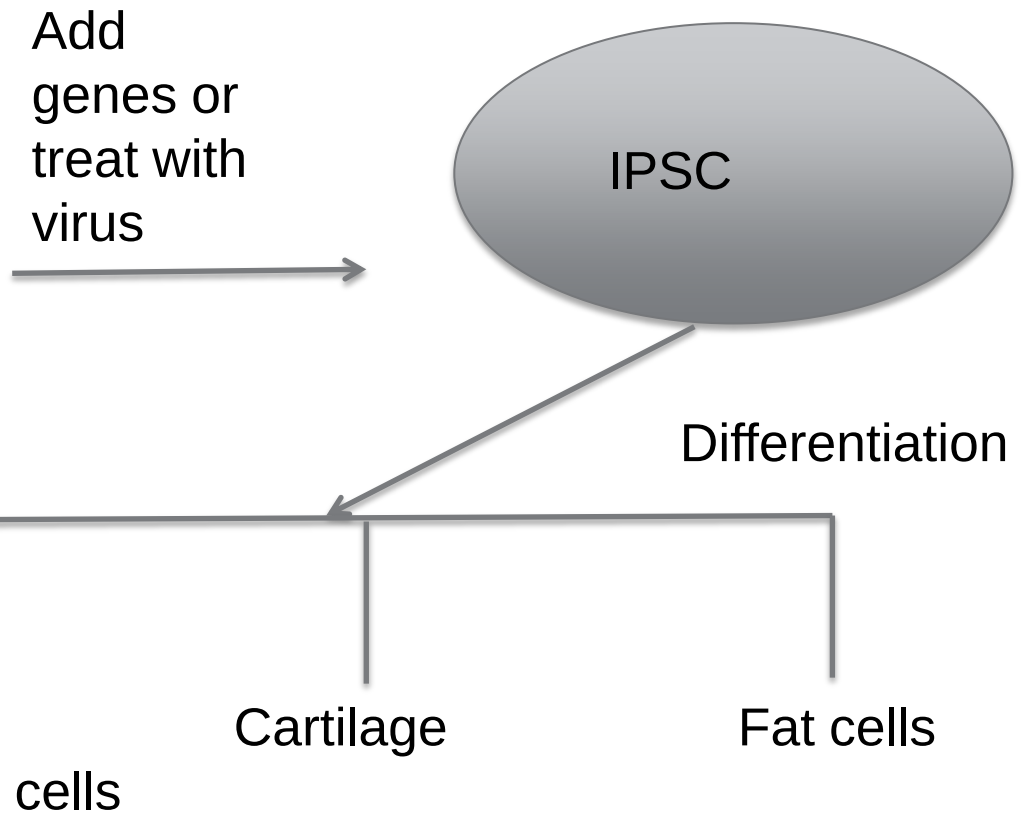


"Transformed" cell line which will grow indefinitely and provide infinite supply of cells and DNA

Induced pluripotent stem cells

Induced pluripotent stem cells (iPSC) are pluripotent cells derived from reprogramming of non-pluripotent cells such as fibroblast, blood cells and lymphoblastotid cell lines.





Initial Aims of WP3

Existing sample collections

- Is there scope for combined analysis strategies?

Data generated from samples

- What harmonisation issues can be addressed?

Future sample collections

- Produce guidelines for harmonising sample collections within constraints of budgets and locations

Cell lines

- How can we utilise the large cohort cell line resources?

ANY SUGGESTIONS?