The background of the slide features a dense, abstract pattern of overlapping circles in various sizes and colors, including shades of pink, blue, and grey, creating a dynamic and modern visual texture.

WHAT IS FUNCTIONAL GENOMICS?

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CRUK BIOINFORMATICS SUMMER SCHOOL

JULY 15TH 2019

WHAT IS FUNCTIONAL GENOMICS?

Functional Genomics is like Teenage Sex

- Everyone talks about it.
- Nobody really knows how to do it.
- Everyone thinks everyone else is doing it.
- So everyone claims they are doing it.

Shamelessly stolen from Dan Ariely (talk about big data)



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WHAT IS FUNCTIONAL GENOMICS?

Determination of the relationship between an organism's genome and its phenotype



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WHAT IS FUNCTIONAL GENOMICS?

Determination of the relationship between an organism's genome and its phenotype



WHAT IS FUNCTIONAL GENOMICS?

Determination of the relationship between an organism's genome and its **phenotype**



Slight variation
in genome
(~0.1% different)

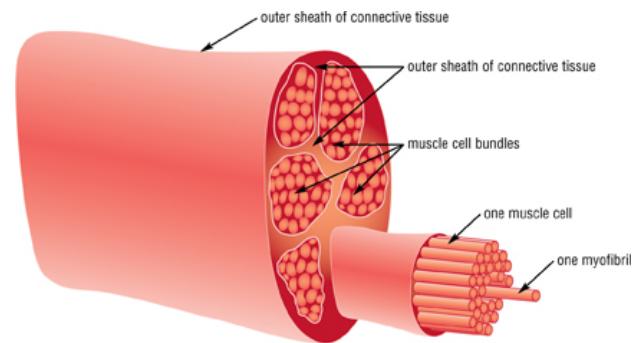


WHAT IS FUNCTIONAL GENOMICS?

Determination of the relationship between an organism's genome and its **phenotype**

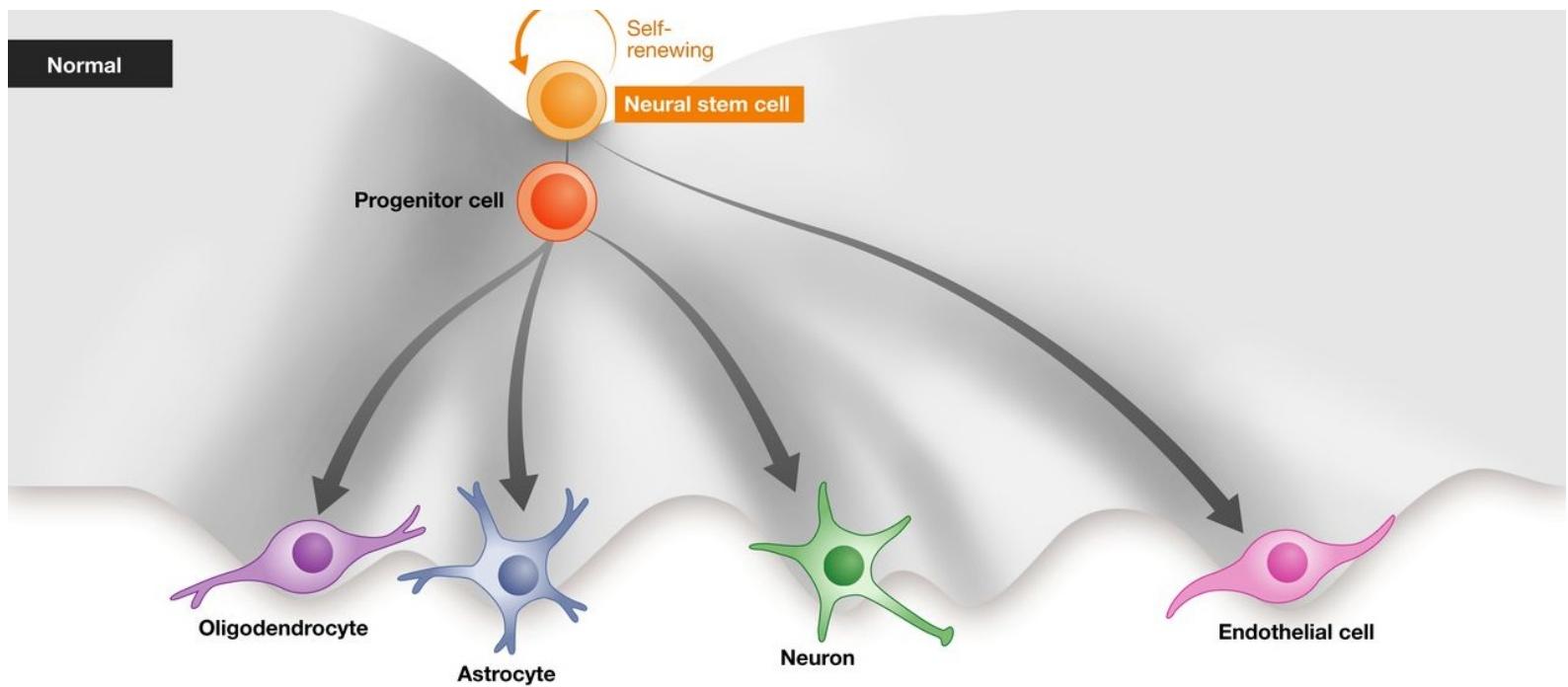


No variation
in genome

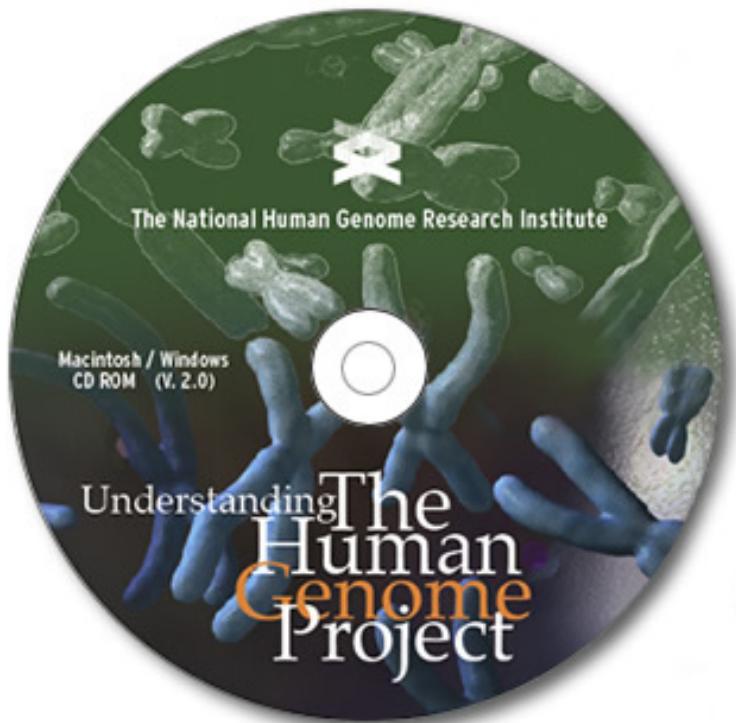


WHAT IS FUNCTIONAL GENOMICS?

Determination of the relationship between an organism's genome and its **phenotype**



WHAT IS (NOT) FUNCTIONAL GENOMICS?



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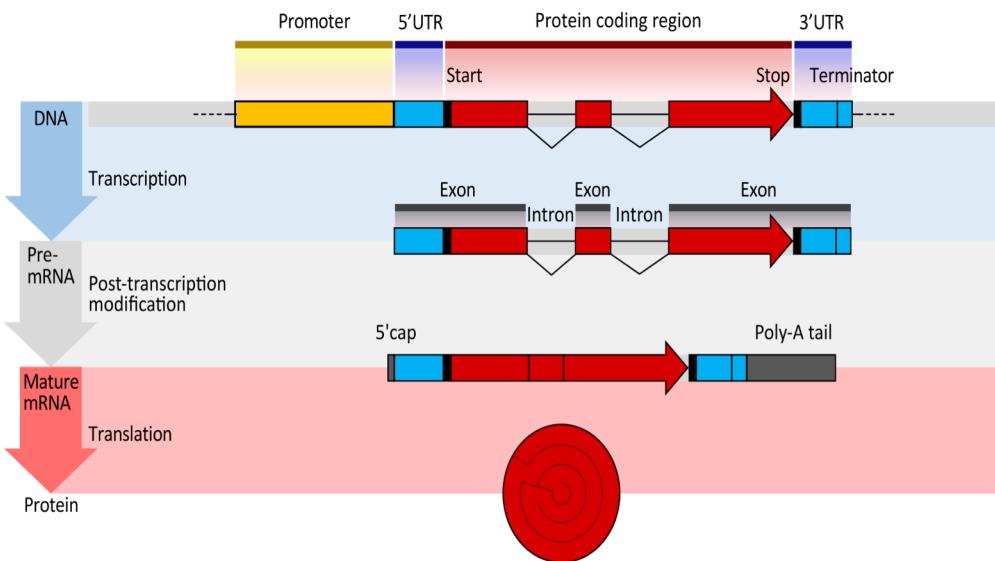
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WHAT IS FUNCTIONAL GENOMICS?

Typical functional genomics questions:

- When and where are genes expressed?
- How do gene expression levels differ in various cell types and states?
- What are the functional roles of different genes and in what cellular processes do they participate?
- How are genes regulated?
- Where are the active gene promoters in a particular cell type?
- How do genes and gene products interact?
- How does gene expression change in various diseases or following a treatment?

WHAT IS FUNCTIONAL GENOMICS?



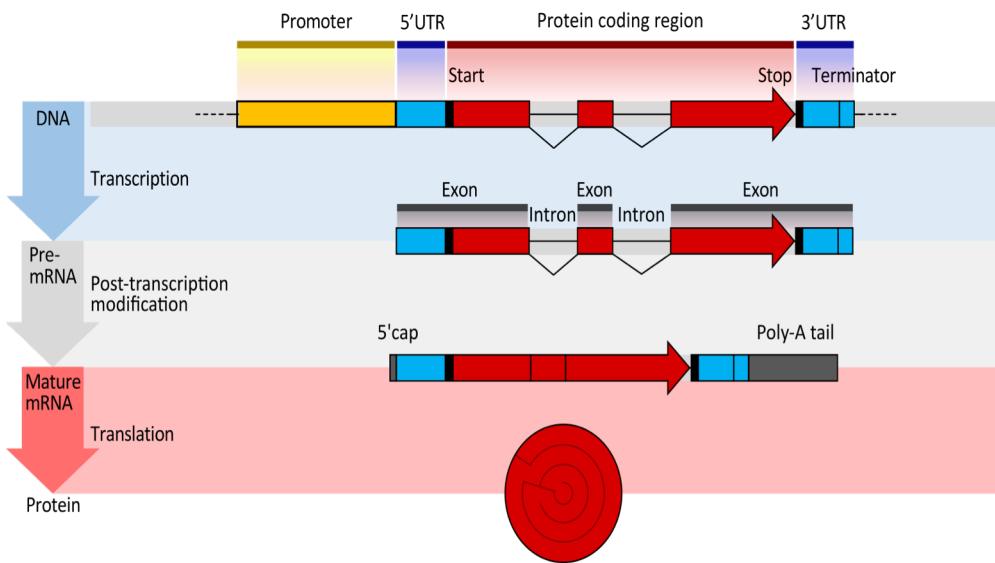
- Variant detection
 - aCGH
 - FISH
 - Sanger
- Epigenetics
 - ChIP-seq
 - Bisulfite seq



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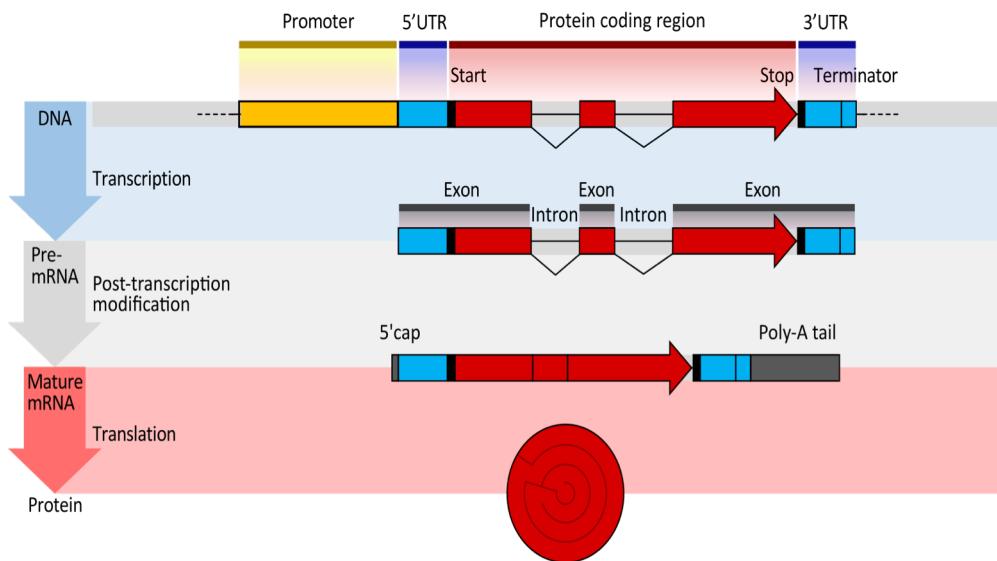
- Transcriptomics
 - Northern Blot
 - qPCR
 - RNA-seq



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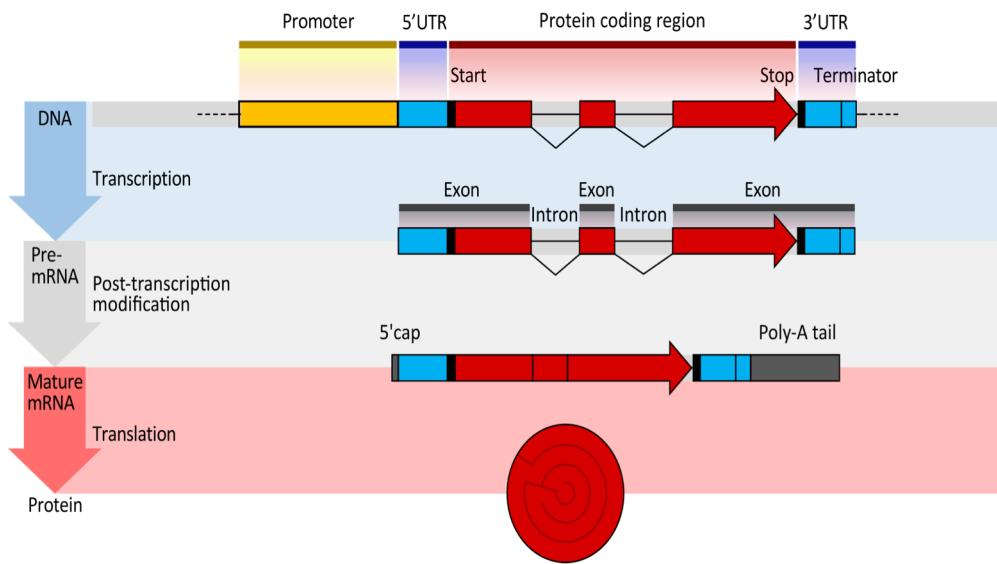
- Transcriptomics
 - Ribo-seq



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WHAT IS FUNCTIONAL GENOMICS?



- Proteomics
 - MS
 - CyTOF
 - Crystallography

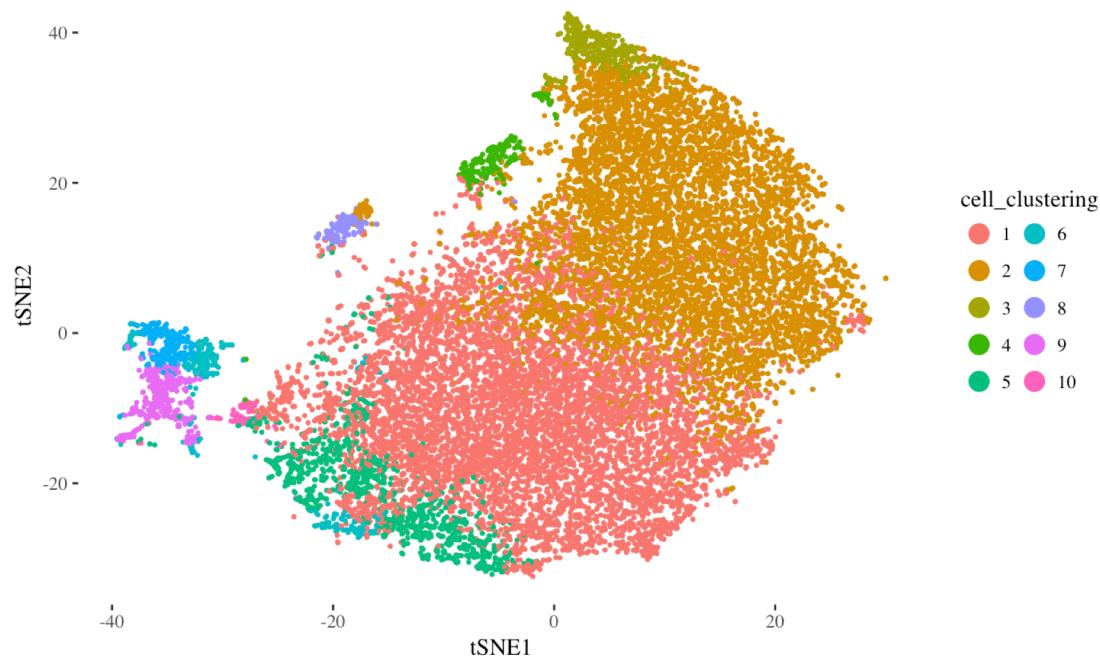


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Single-cell sequencing



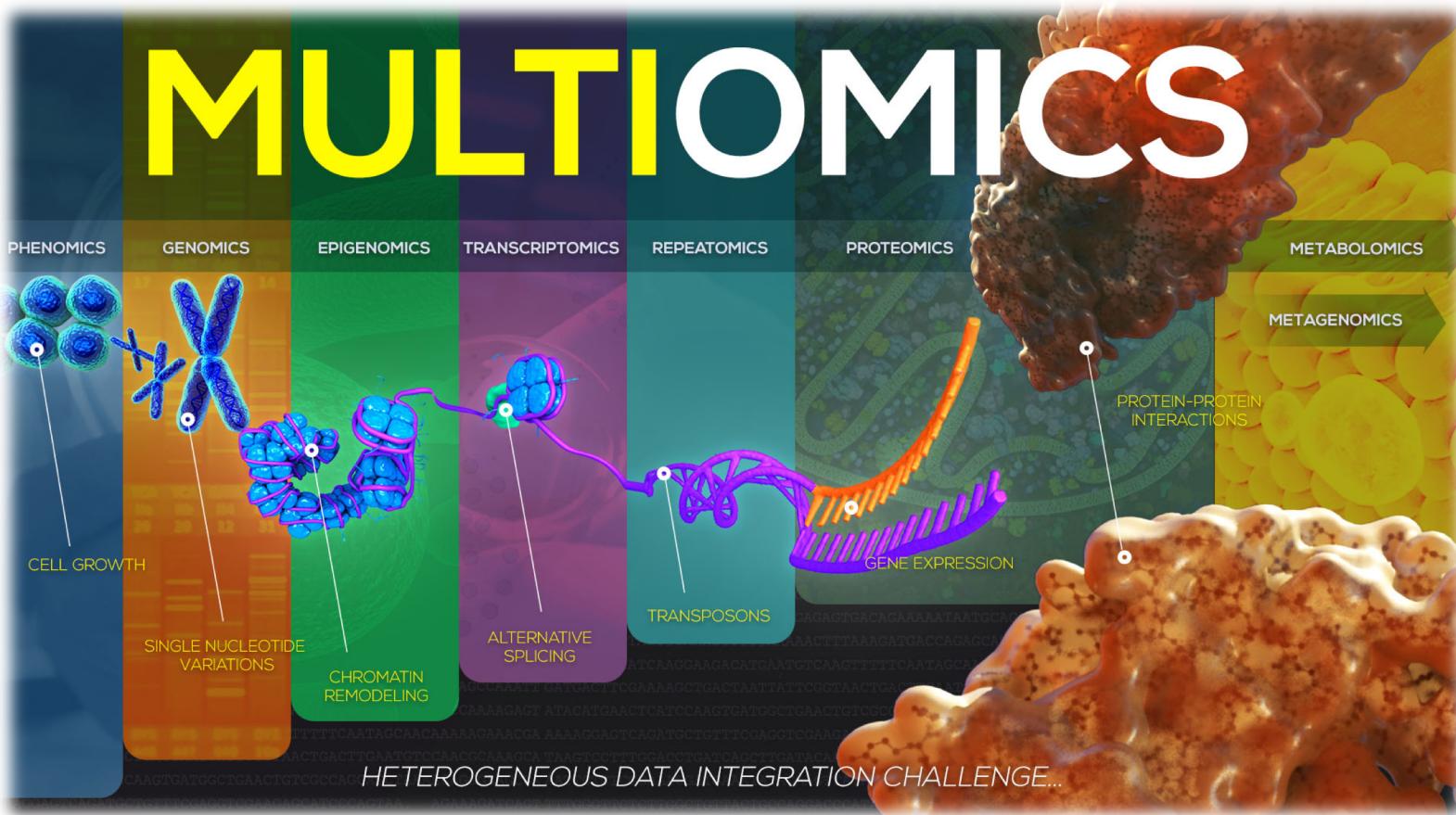
scRNAseq on Xenograft tumour



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