

Canadian Bioinformatics Workshops

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RNA-Seq Module 5: Alternative Splicing Analysis

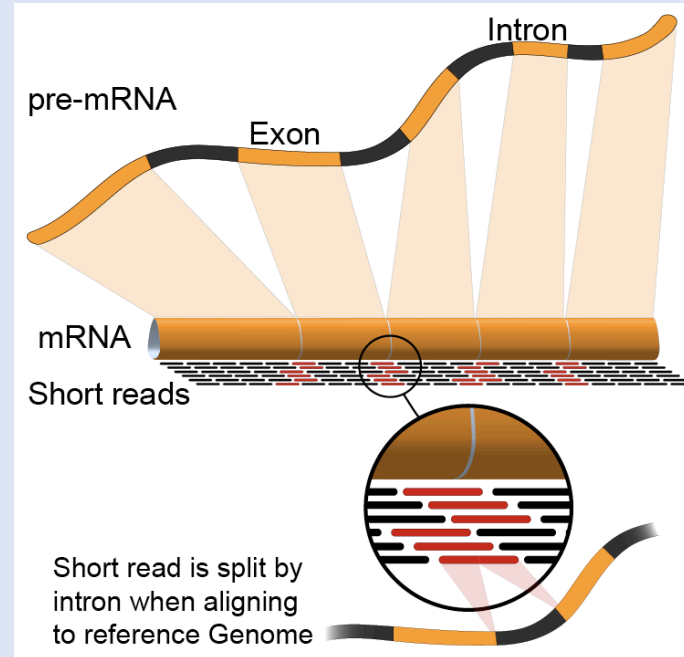
Obi Griffith and Malachi Griffith
RNA-seq Analysis 2023. July 17-19, 2023



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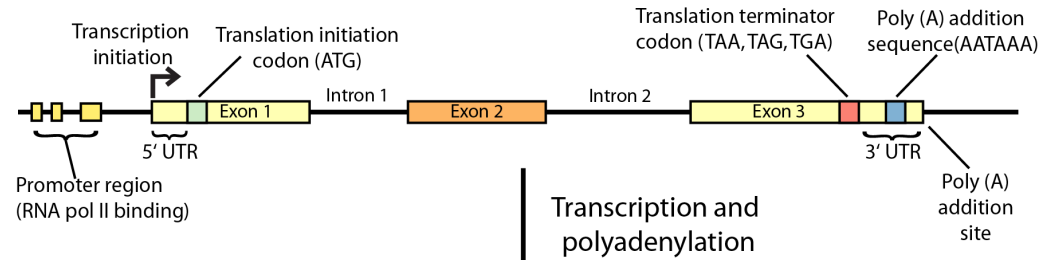
CSH Cold Spring Harbor Laboratory

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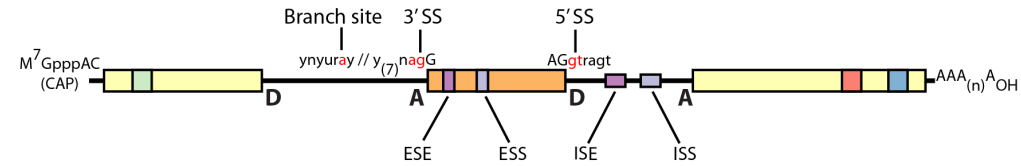
The block contains the bioinformatics.ca logo at the top left, a network diagram with red nodes and white lines below it, the Cold Spring Harbor Laboratory (CSH) logo in the center, and another bioinformatics.ca logo at the bottom right.

Review of gene expression

Double-stranded genomic DNA template

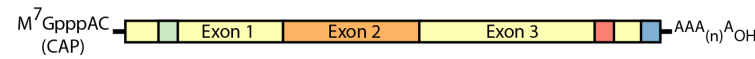


Single-stranded pre-mRNA (nuclear RNA)



RNA processing

Mature mRNA

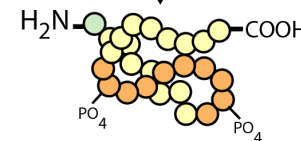


Export to cytoplasm and translation

Protein (amino acid sequence)

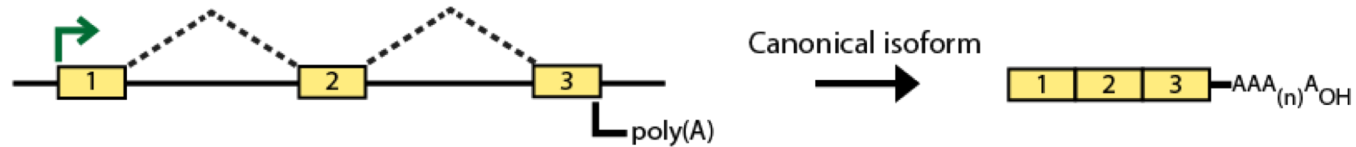


Folding, posttranslational modification, subcellular localization, etc.

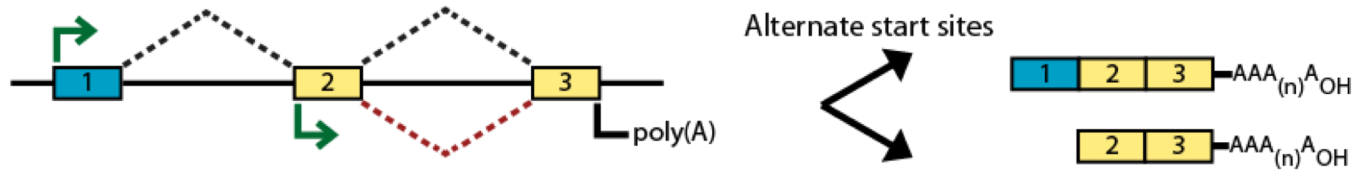


Types of alternative expression - part 1

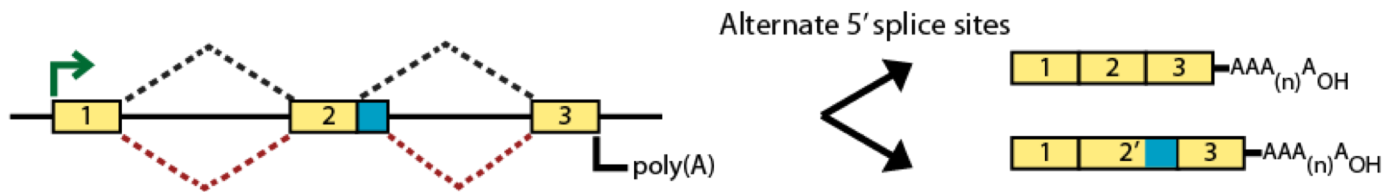
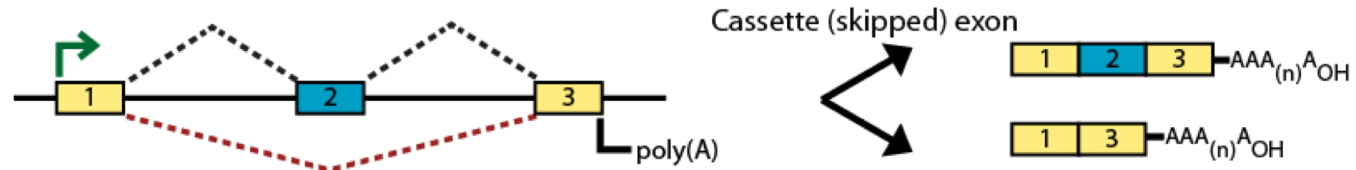
Simple transcription



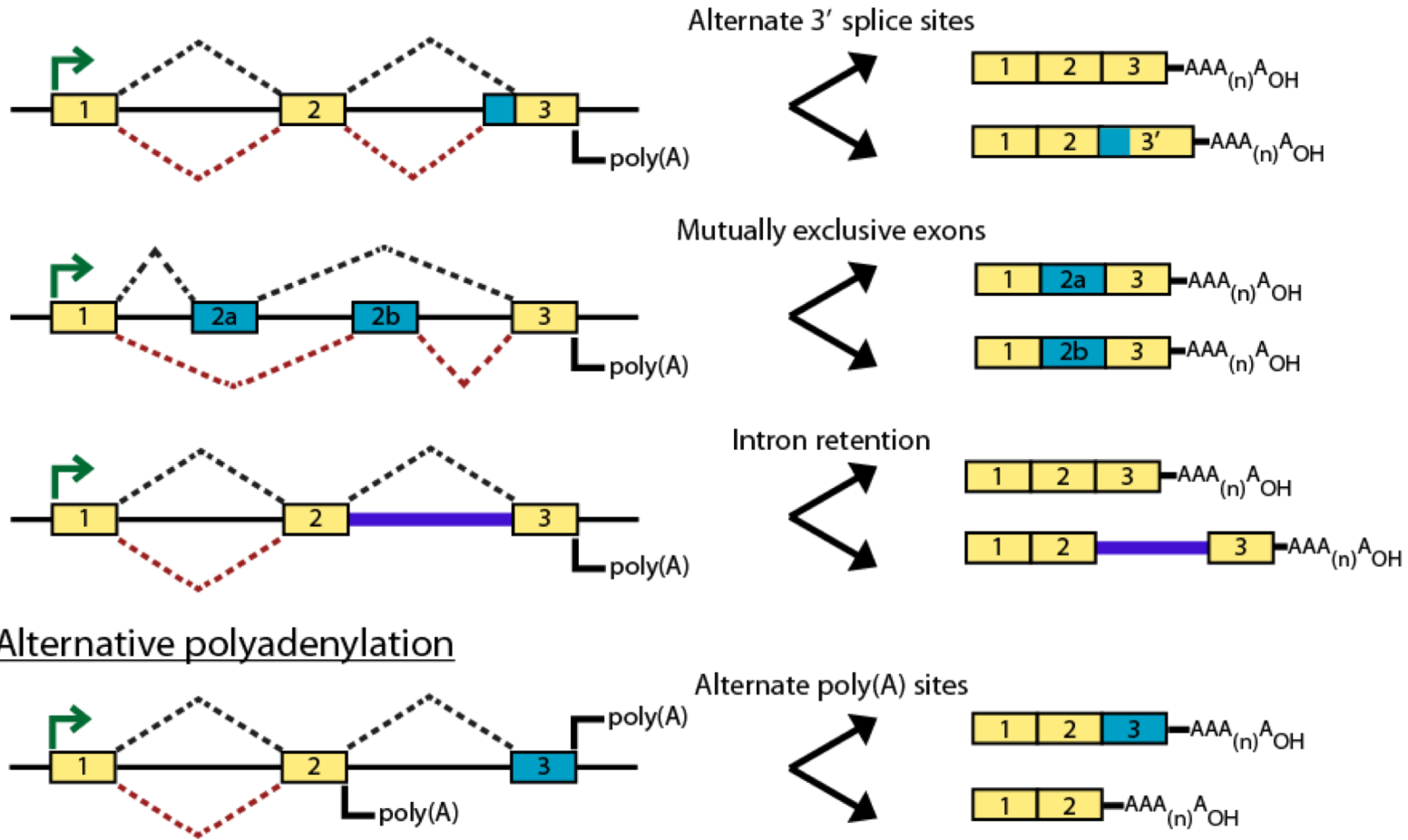
Alternative transcript initiation



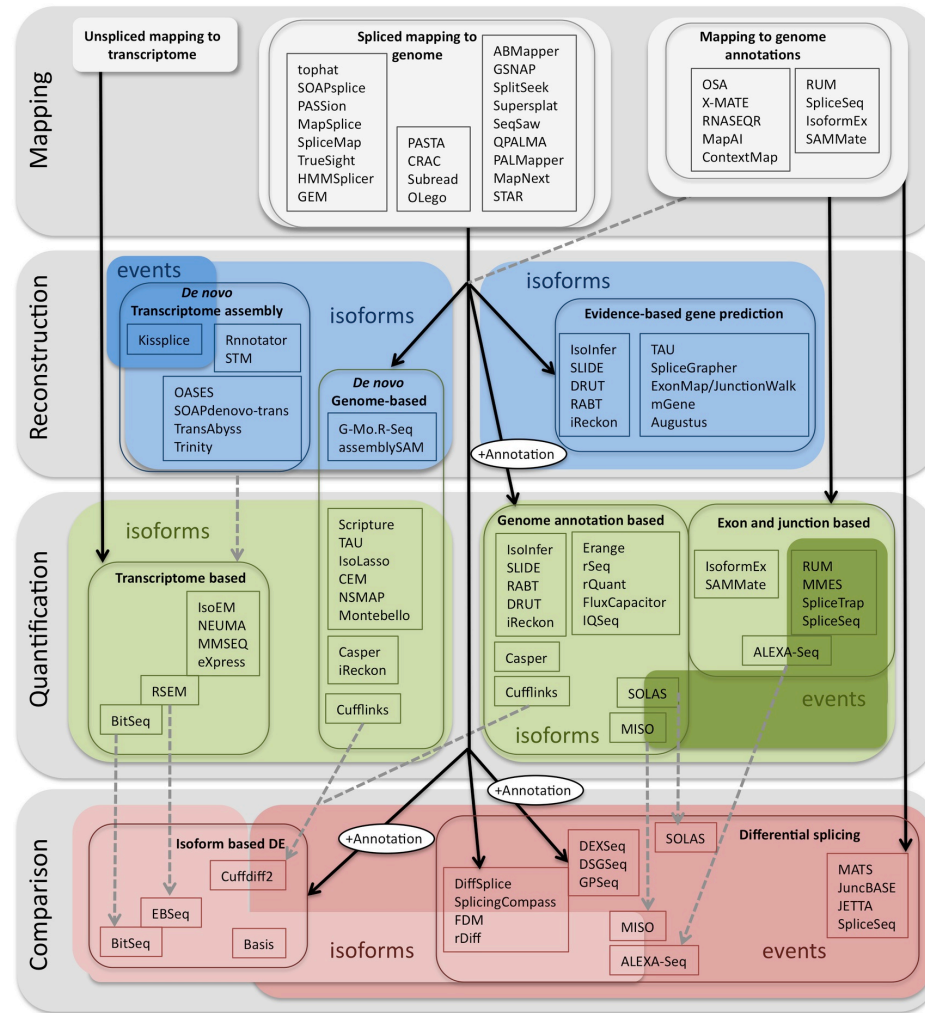
Alternative splicing



Types of alternative expression – part 2

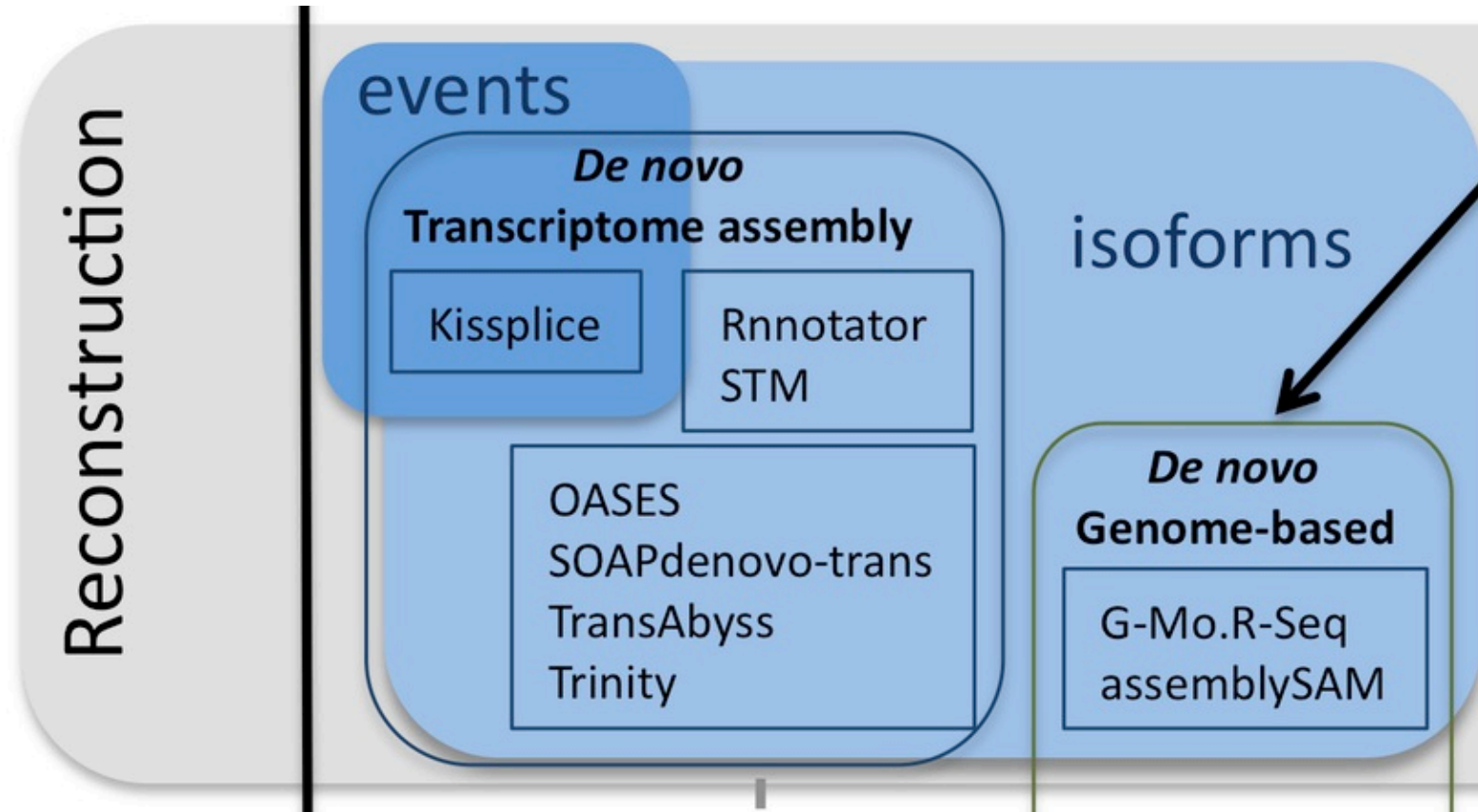


Methods to study splicing by RNA-seq



<http://www.rna-seqblog.com/data-analysis/splicing-junction/methods-to-study-splicing-from-rna-seq/>
<http://arxiv.org/ftp/arxiv/papers/1304/1304.5952.pdf>

Methods to study splicing by RNA-seq

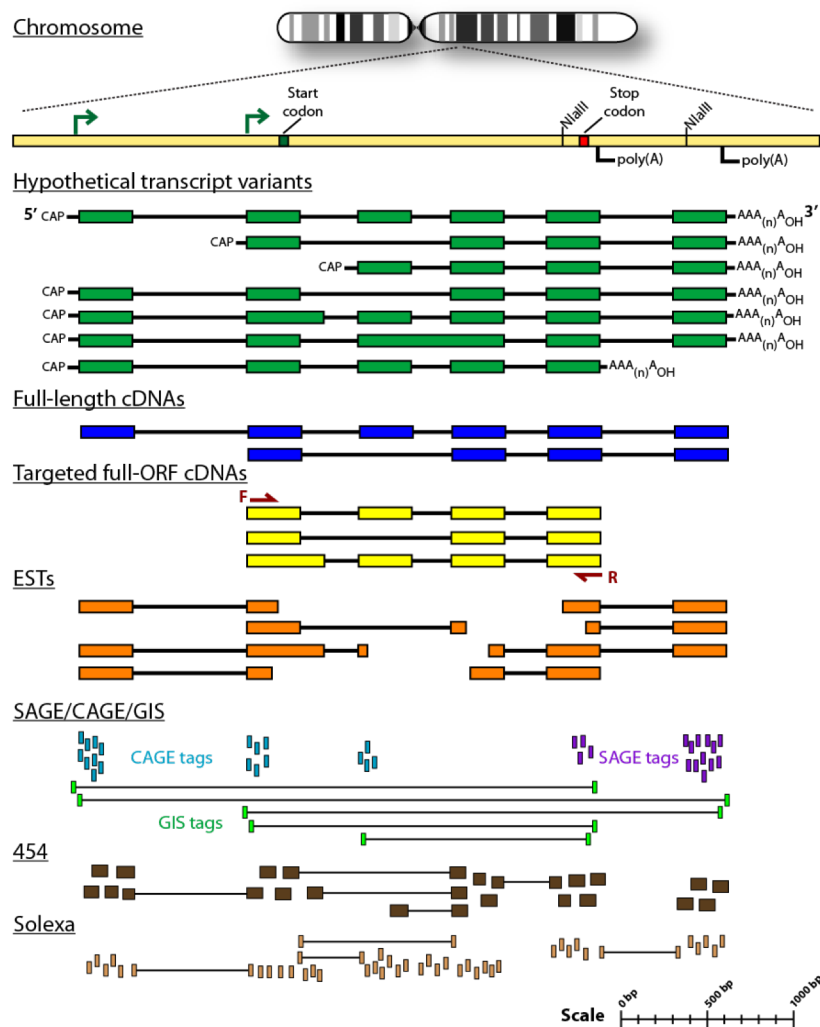


<http://www.rna-seqblog.com/data-analysis/splicing-junction/methods-to-study-splicing-from-rna-seq/>
<http://arxiv.org/ftp/arxiv/papers/1304/1304.5952.pdf>

Useful resources and discussion

- Best approach to predict novel and alternative splicing events from RNA-seq data
 - <http://www.biostars.org/p/68966/>
 - <http://www.biostars.org/p/62728/>
- Alternative splicing detection
 - <http://www.biostars.org/p/65617/>
 - <http://www.biostars.org/p/11695/>
- Identifying genes that express different isoforms in cancer vs normal RNA-seq data
 - <http://www.biostars.org/p/50365/>
- Cufflinks / Cuffdiff Output - How are tests different?
 - <http://www.biostars.org/p/13525/>
- Visualization of alternative splicing events using RNA-seq data
 - <http://www.biostars.org/p/8979/>

Sequencing methods for studying alternative isoforms



We are on a Coffee Break & Networking Session

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