



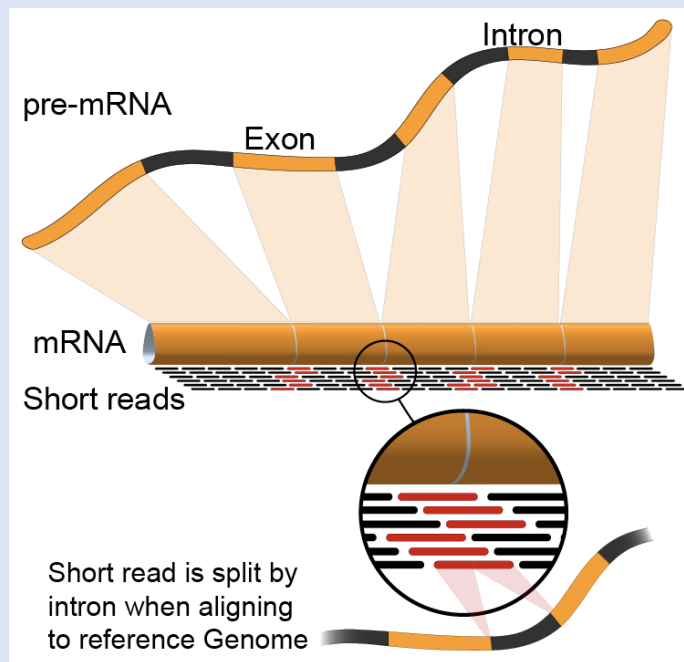
Cold
Spring
Harbor
Laboratory

RNA-Seq Module 5

Alternative Splicing Analysis

Kelsy Cotto, Felicia Gomez, Obi Griffith, Malachi Griffith,
My Hoang, Chris Miller, Huiming Xia

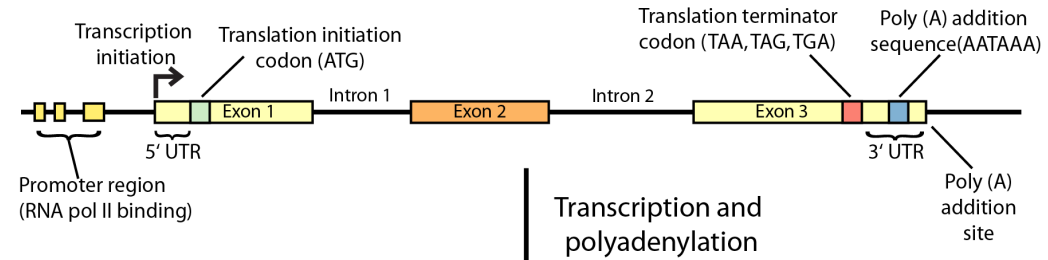
Advanced Sequencing Technologies & Bioinformatics Analysis November 6-20, 2022



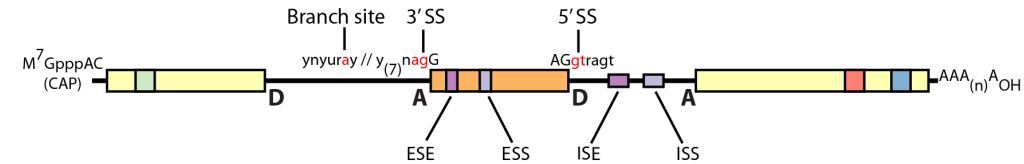
 Washington University in St. Louis
SCHOOL OF MEDICINE

Review of gene expression

Double-stranded genomic DNA template

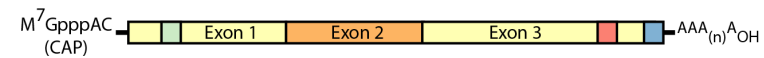


Single-stranded pre-mRNA (nuclear RNA)



RNA processing

Mature mRNA

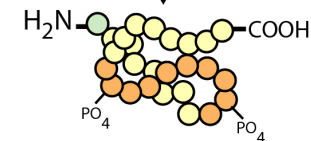


Export to cytoplasm and translation

Protein (amino acid sequence)

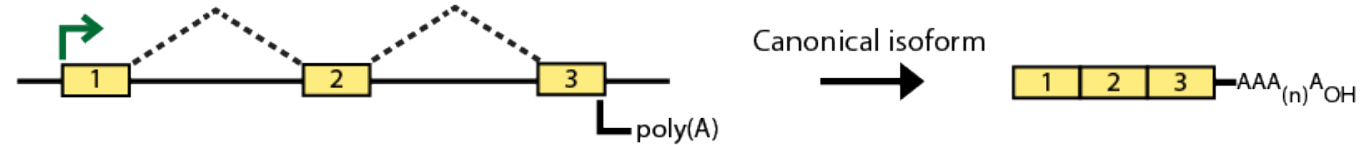


Folding, posttranslational modification, subcellular localization, etc.

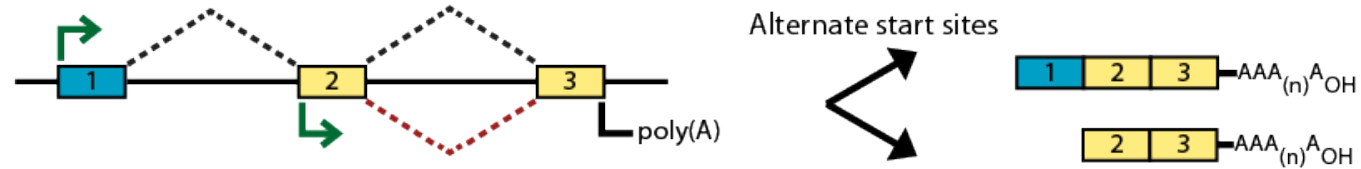


Types of alternative expression - part 1

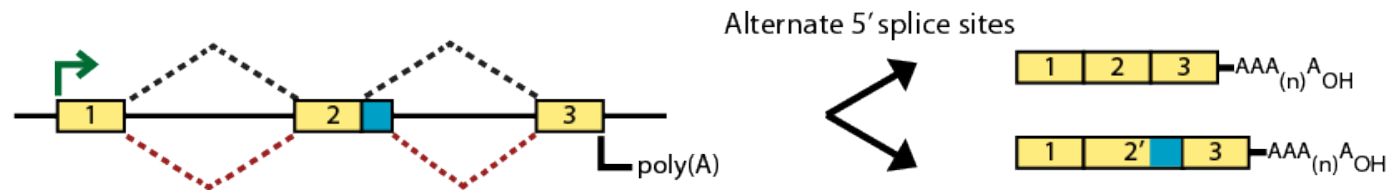
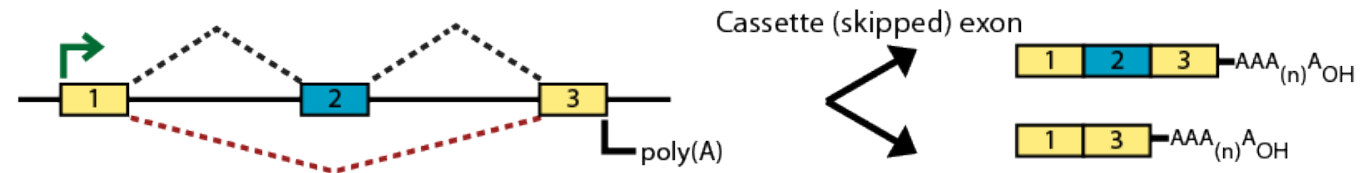
Simple transcription



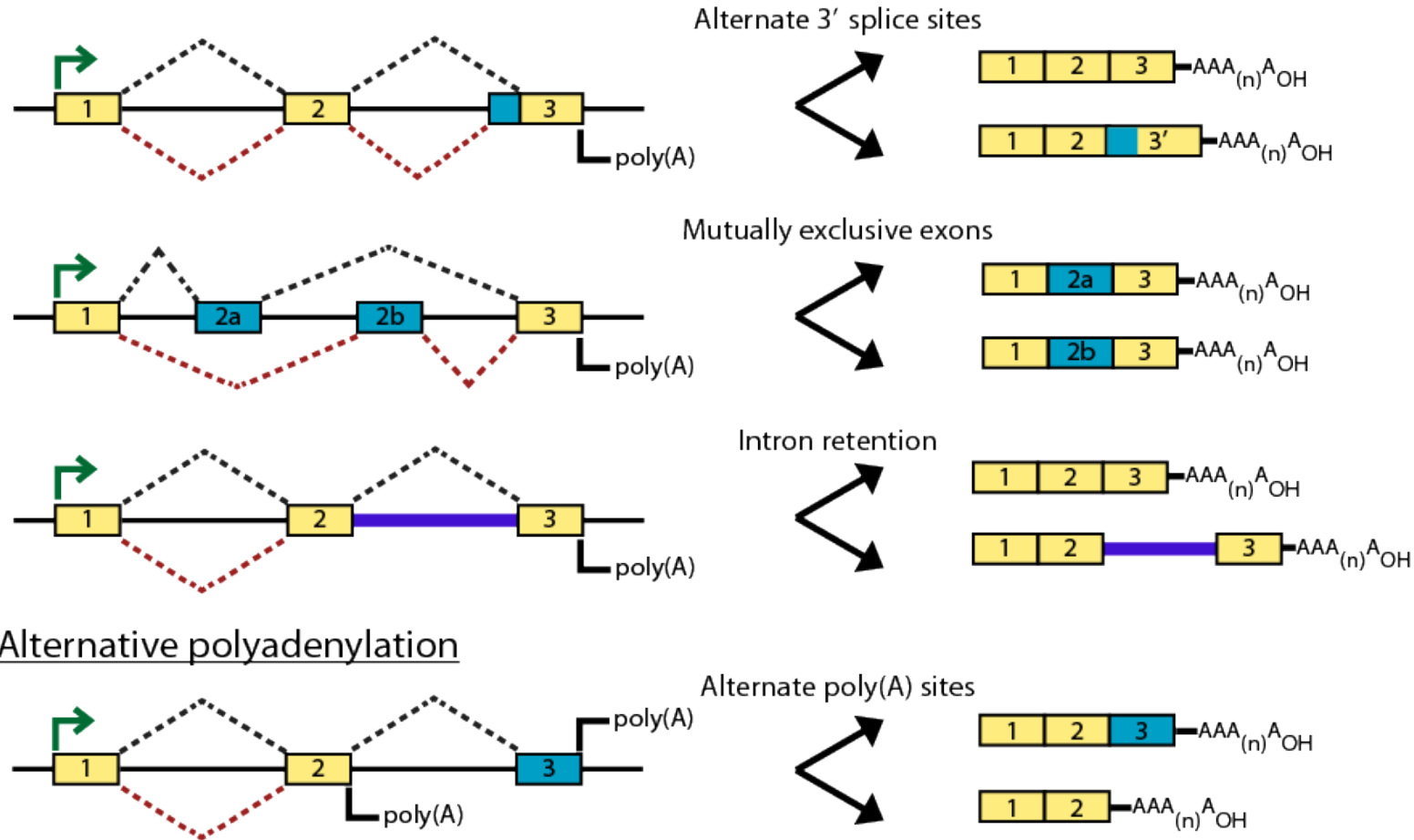
Alternative transcript initiation



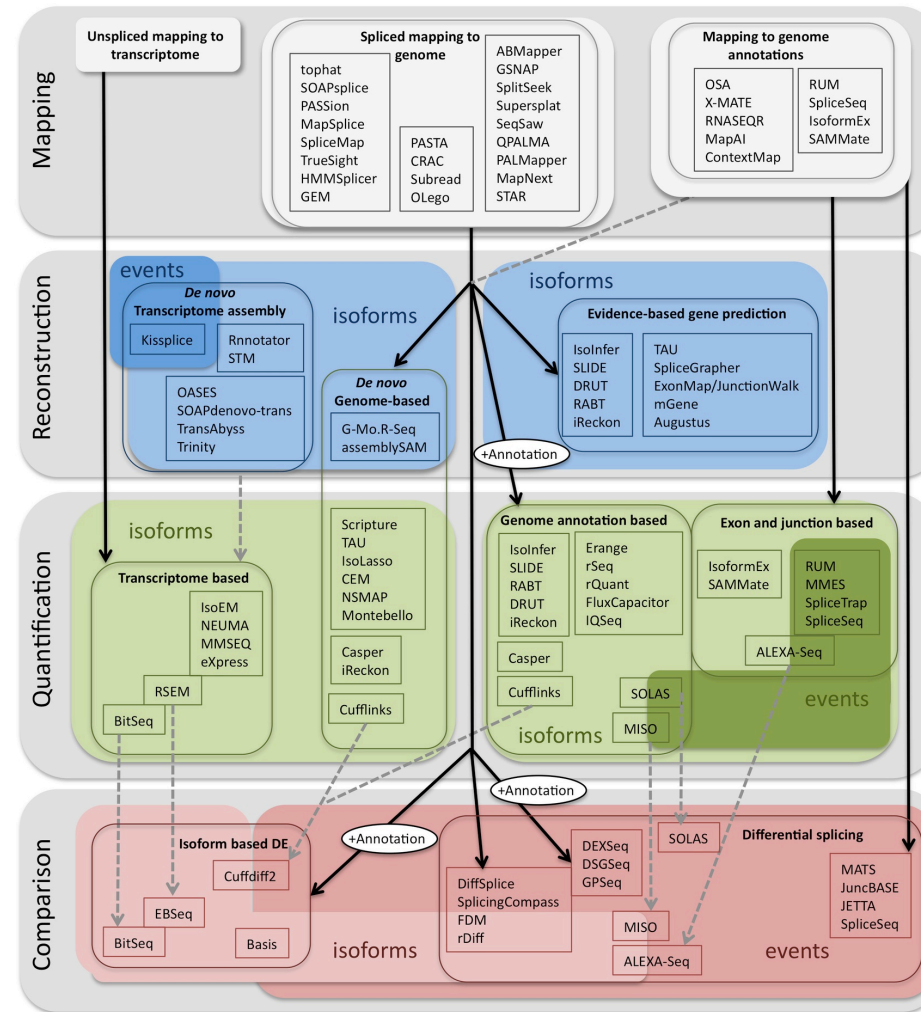
Alternative splicing



Types of alternative expression – part 2

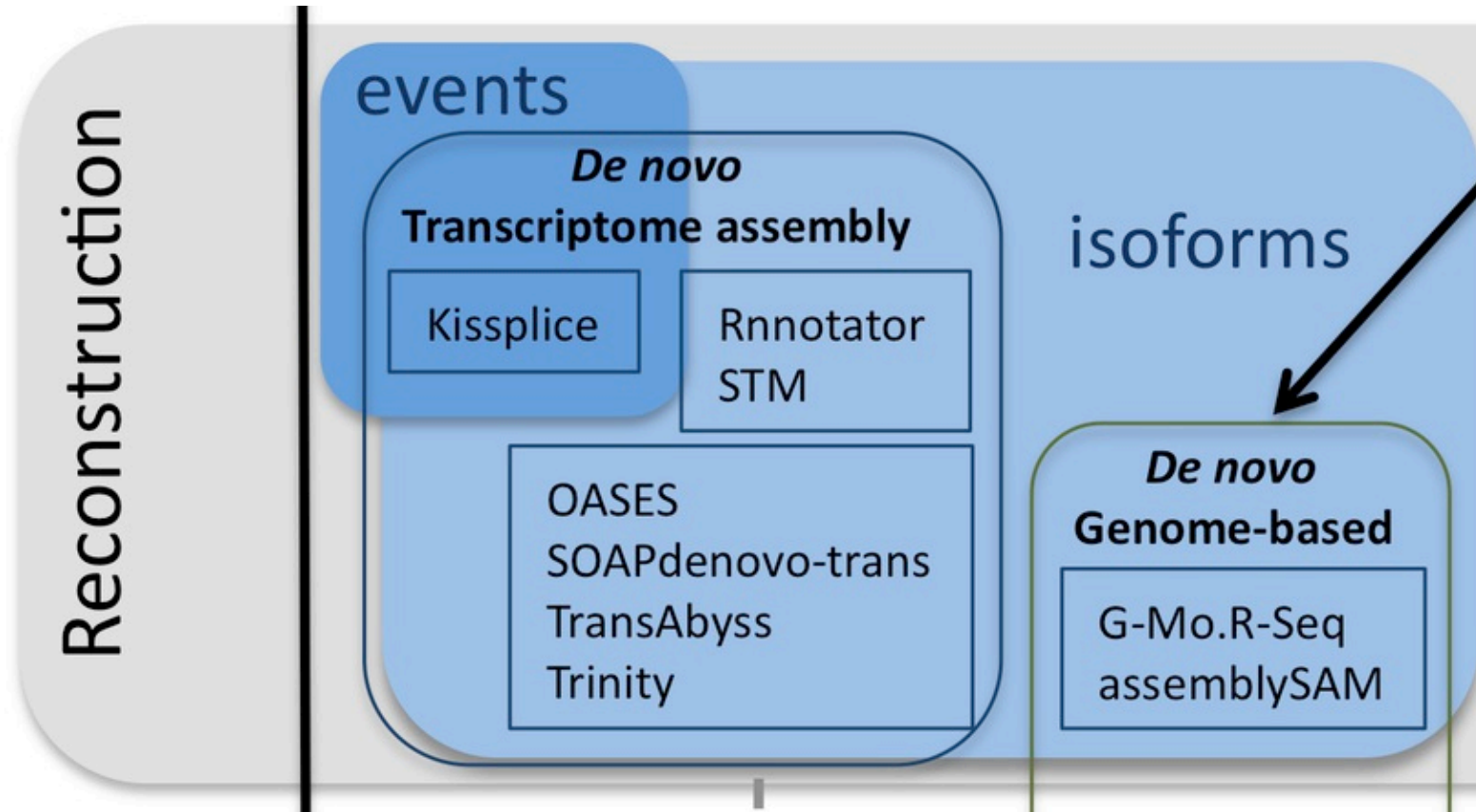


Methods to study splicing by RNA-seq



<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>

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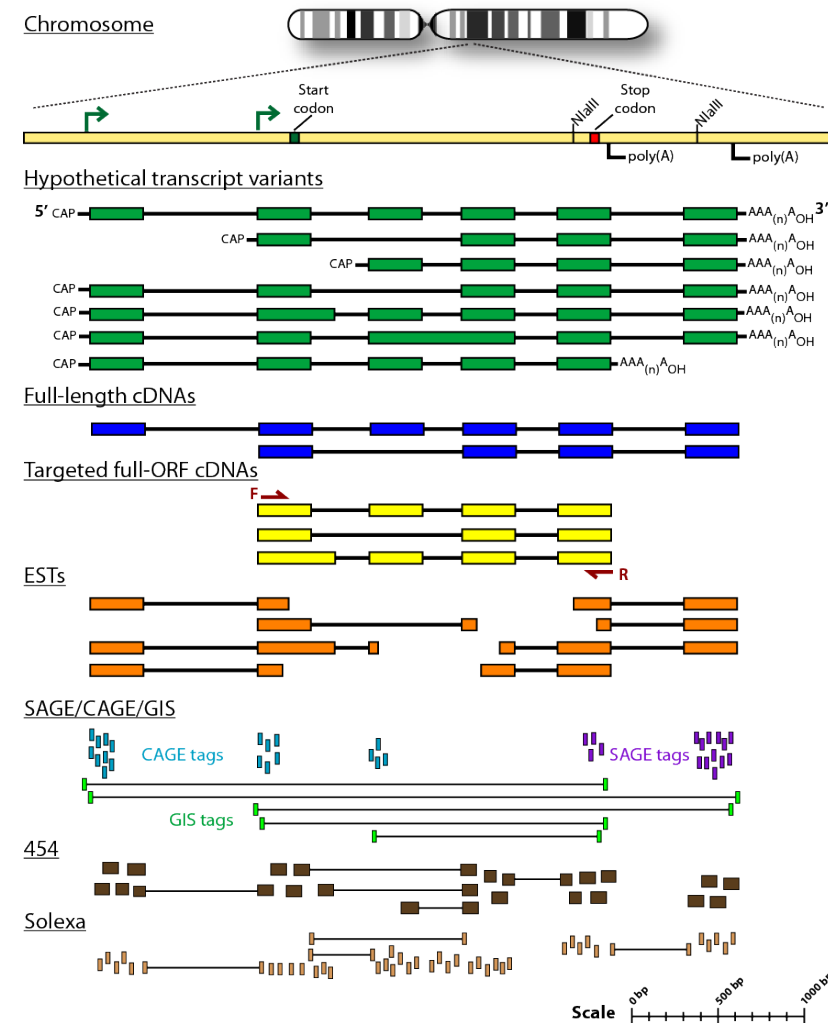


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Useful resources and discussion

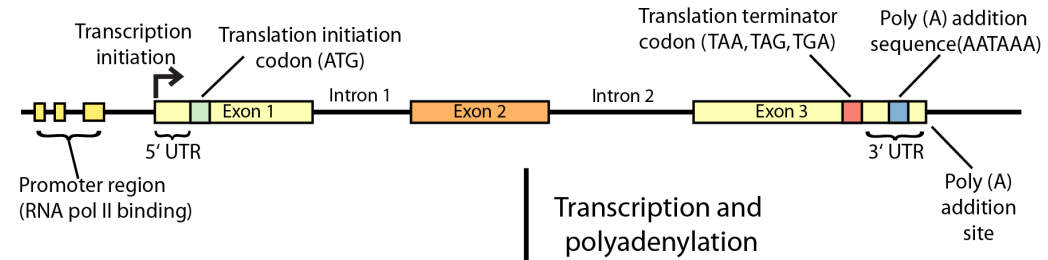
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 - <http://www.biostars.org/p/68966/>
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- Identifying genes that express different isoforms in cancer vs normal RNA-seq data
 - <http://www.biostars.org/p/50365/>
- Cufflinks / Cuffdiff Output - How are tests different?
 - <http://www.biostars.org/p/13525/>
- Visualization of alternative splicing events using RNA-seq data
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Sequencing methods for studying alternative isoforms



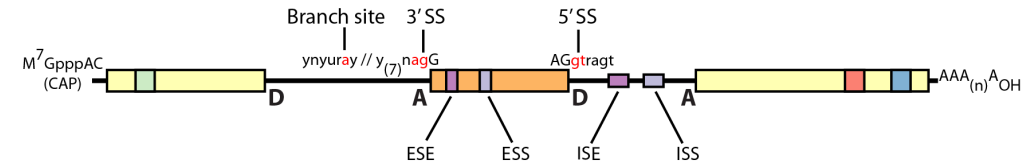
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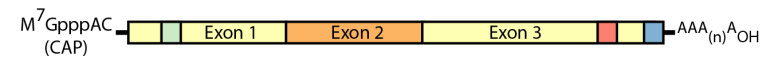
Transcription and polyadenylation

Single-stranded pre-mRNA (nuclear RNA)



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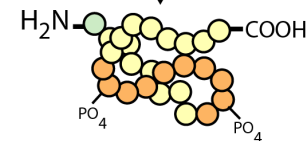


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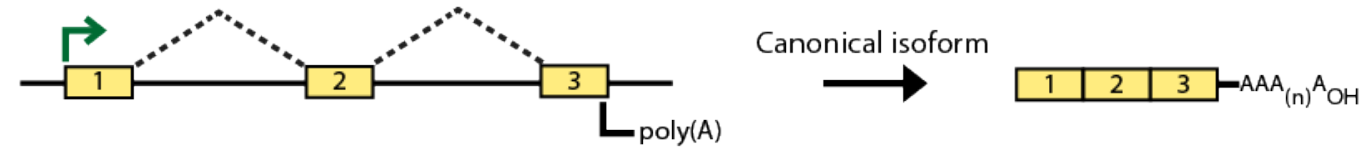


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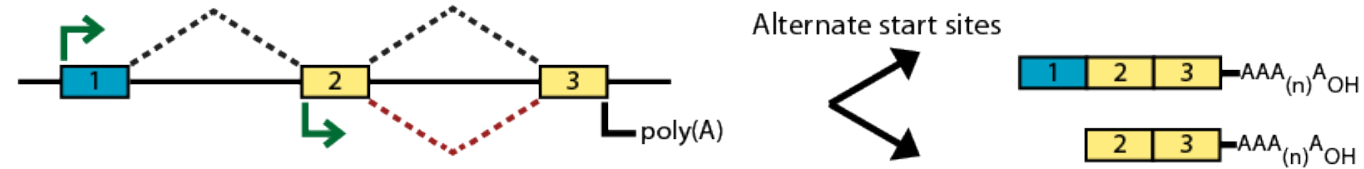


Types of alternative expression - part 1

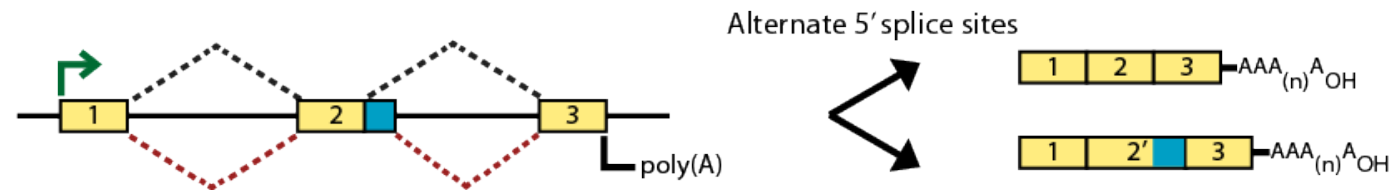
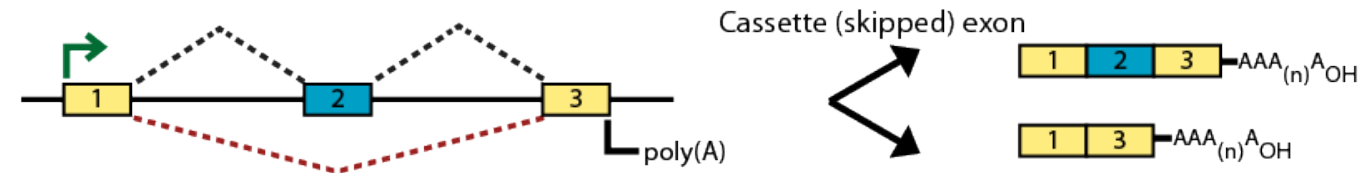
Simple transcription



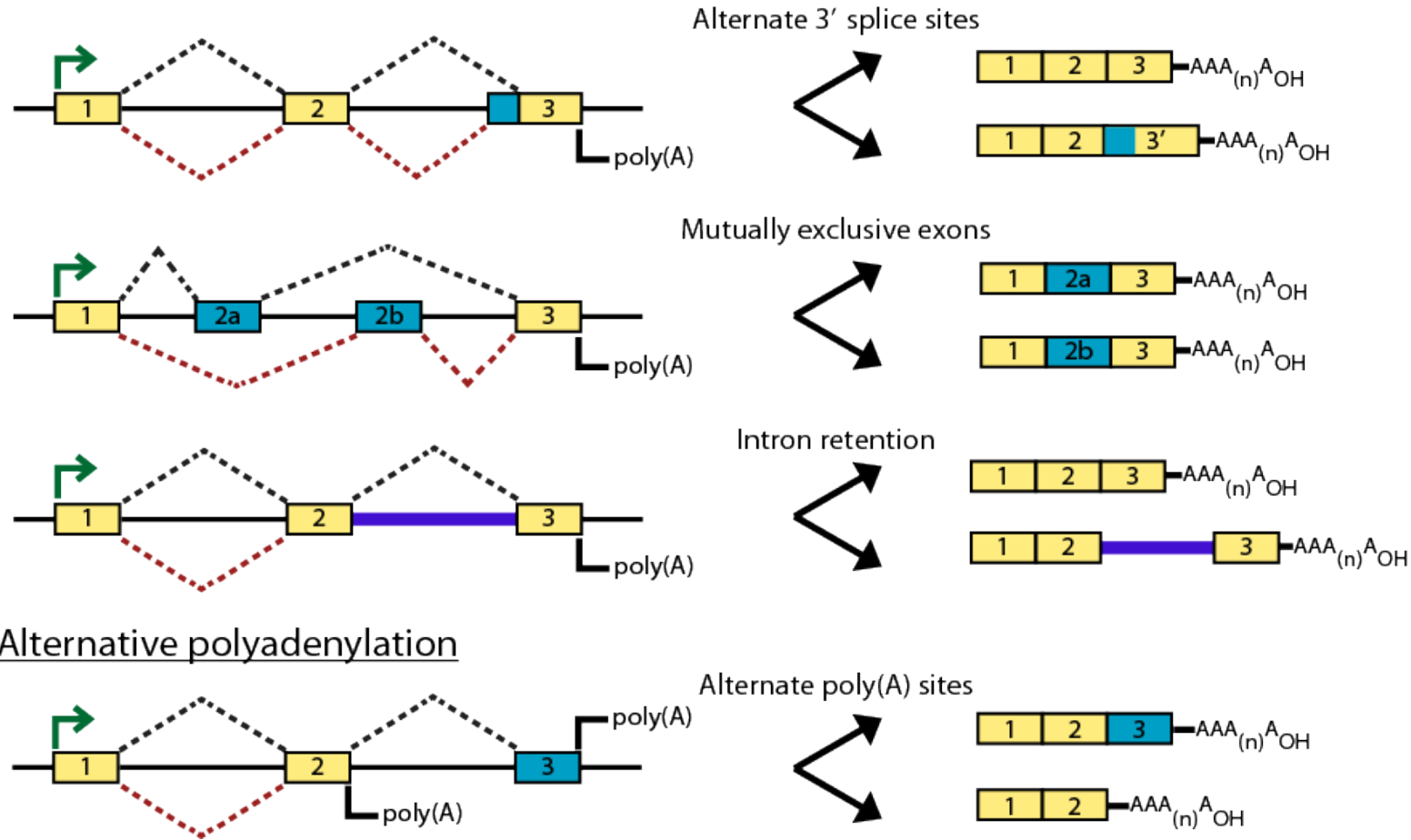
Alternative transcript initiation



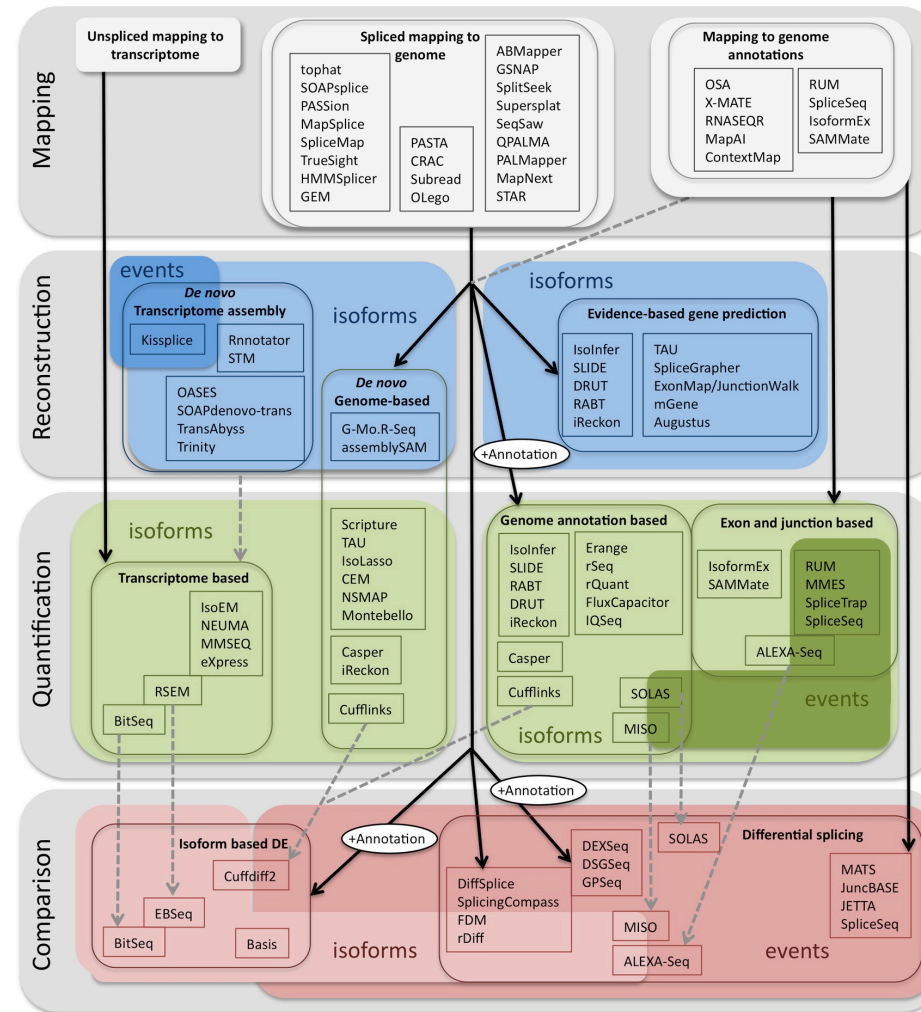
Alternative splicing



Types of alternative expression – part 2

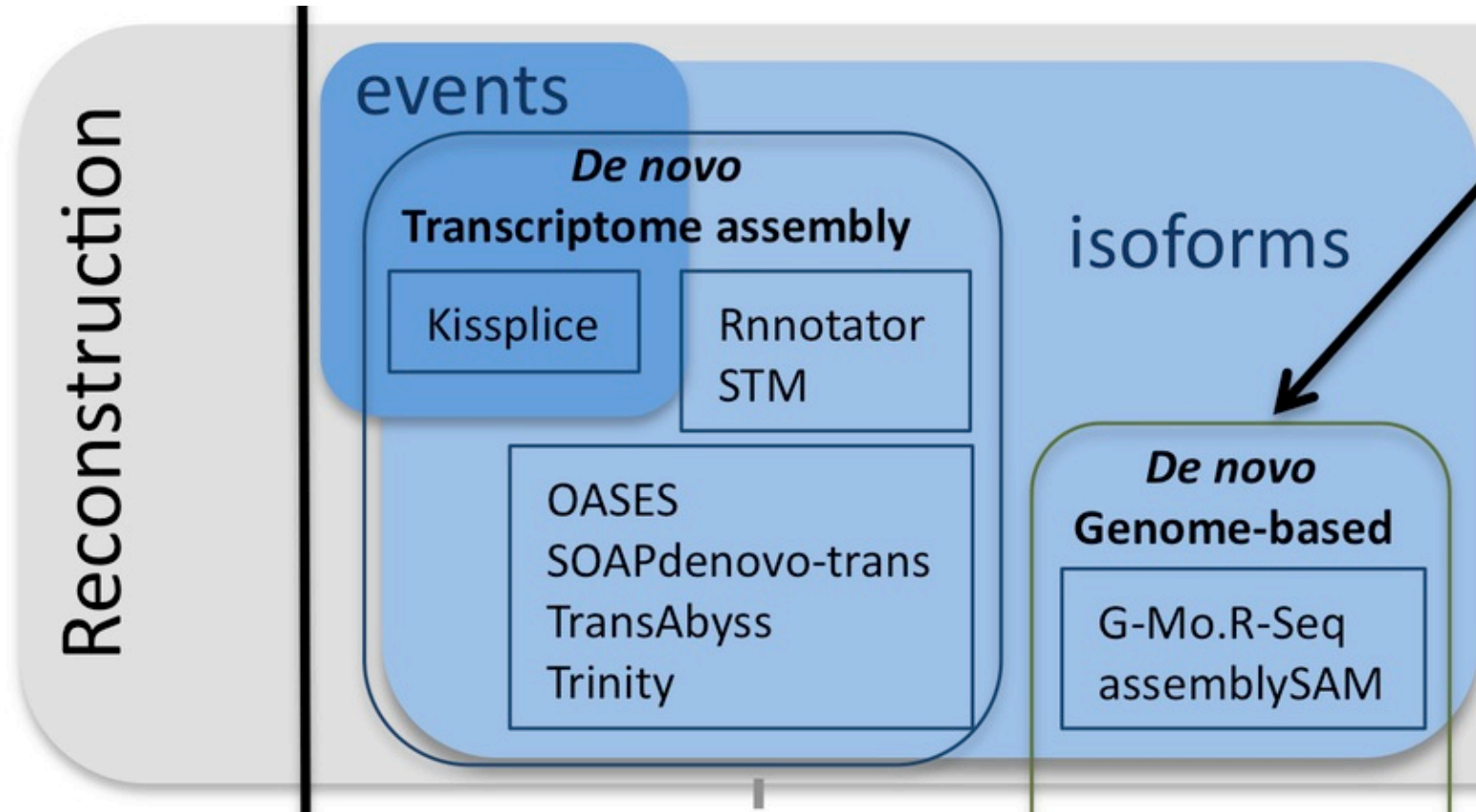


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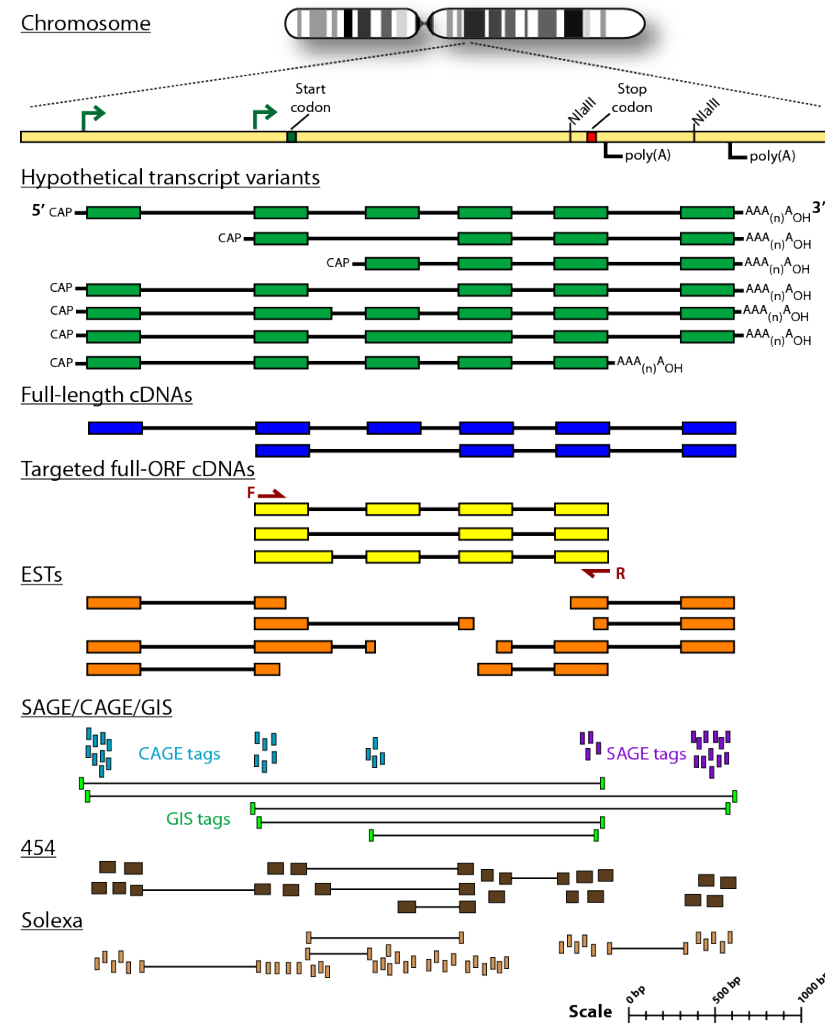


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Sequencing methods for studying alternative isoforms



We are on a Coffee Break &
Networking Session