

Title: Are introns early or are they late? Or are they both early and late?

Abstract: There are two main theories on the origin of introns, the intron-early theory and the intron-late theory. The Intron-Early Theory (or the Exon Theory of Genes) proposes that the introns were used to assemble the first genes. The first genes were made of small pieces and the basic method used by evolution to make new genes was to shuffle the exons and fuse them together to make more complicated exons. On the other hand, the Intron-Late Theory proposes that introns were added during evolution, resulting in break-up of previously continuous genes.

The data we have been working with are the exon lengths observed in present day genomes. Different distributions of the exon lengths are predicted by those two theories (intron-early/intron-late). Preliminary analysis has shown that neither of those predicted distributions give a very good fit. Therefore we are suggesting that a model based on a mixture of the two predicted distributions would give a better fit. We have been using the EM-algorithm to fit mixture models and we have got some very interesting results suggesting that both theories may in part be correct.

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