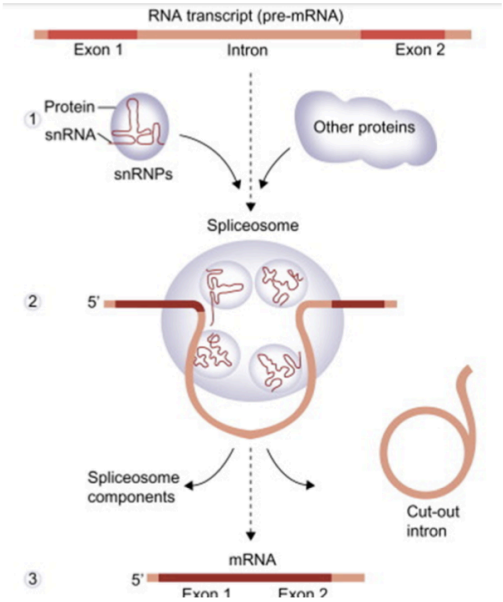
RNA Maturation and Decay

This figure shows how cells process pre-mRNA by removing introns and joining exons through a process called RNA splicing.



First, small nuclear ribonucleoproteins (snRNPs), which are complexes of RNA and protein, along with other proteins, assemble on the pre-mRNA to form a spliceosome. The spliceosome recognizes the boundaries between exons and introns, loops the intron into a lariat shape (loop when the intron folds back on itself), and cuts it out while simultaneously joining the two exons together. The cut out intron is released and degraded, while the exons remain connected as a continuous sequence, producing a mature mRNA molecule that can be translated into protein.

On a side note though (might seem like a stupid question), but why are introns even necessary then if they're just cut out? "Introns are noncoding segments inside genes that cells cut out during RNA splicing, and they exist because they give genes powerful flexibility and control. They let cells mix exons in different ways (alternative splicing) to make multiple proteins from one gene, and they carry regulatory signals that control when and how genes are used. During splicing, proteins are placed at the newly joined exon–exon boundaries—these are called exon junction complexes (EJCs). They act as markers that tell the cell the mRNA is fully and correctly processed, help guide it out of the nucleus, and allow the cell to detect and destroy faulty mRNAs with premature stop codons. Without introns, these markers wouldn't be added, and the cell would lose an important quality control step. Over evolution, introns also make it easier to shuffle or add new gene parts without breaking existing proteins. In short, introns cost extra processing but give cells much more control, variety, and reliability. "