Antisense Rna Encyclopedia Article

Antisense Rna

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Deoxyribonucleic acid (**DNA**) is made up of two strands. Both strands can act as templates to produce a molecule called **ribonucleic acid** (**RNA**). One of the DNA strands contains information on the organism in which it resides. The RNA produced from this strand, which in turn will act as a template for the production of protein, is called **messenger RNA**. It is also described as being sense RNA. The RNA produced from the other DNA strand is called antisense RNA. The sense and antisense RNAs are complimentary and the strands will readily bind together to form a duplex. Formation of the RNA duplex prevents the sense RNA from being read by the cellular machinery to produce protein. In this manner the antisense RNA functions as regulator of **gene expression**.

The vast majority of antisense RNAs are inhibitors of **gene** expression. But antisense RNA activation of messenger RNA has been shown in *Staphylococcus aureus*, perhaps by over riding one of the stop mechanisms in the protein production process.

Antisense RNA occurs naturally and is a mechanism used to regulate the expression of genetic material cells. For example, in both mice and humans, the gene for the insulin-like growth factor 2 receptor that is inherited from the father synthesizes an antisense RNA that may block the synthesis of the messenger RNA for the growth factor receptor. Inhibition of other **cell** processes by antisense RNA is also important in the programmed death of prokaryotic microorganisms.

The ability of antisense RNA to selectively inhibit protein is being explored in the context of **gene therapy** - the genetic correction of medical maladies. Delivery of antisense RNA to targets in the body via certain retroviruses may hold potential in acquired immunodeficiency.

The antisense RNA behavior may also have commercial potential. Antisense RNA successfully prevented production an enzyme involved in spoilage in a transgenic tomato, although other unrelated problems led to withdrawal of the product from the market.