Sidney Altman—Nobel Laureate for Work With RNA

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Molecular biologist Sidney Altman shared the 1989 Nobel Prize in chemistry with Thomas R. Cech (1947-) for their discovery that RNA actively aids chemical reactions in cells. Working independently, Altman and Cech discovered a new role for RNA. It was believed that enzymatic activity—the triggering and acceleration of vital chemical reactions within living cells—was exclusively the work of proteins. Their revolutionary discovery was that RNA, considered to be a carrier of genetic codes between parts of the cell, also had an enzymatic function. This discovery opened up new fields of scientific research and biotechnology and provided insight into how cells function.

Altman was born on May 7, 1939, in Montreal, Quebec, Canada. Although he became a US citizen in 1984, he retained his Canadian citizenship. In 1960, he received a BS degree in physics from Massachusetts Institute of Technology in Cambridge. From 1960 to 1962, he was a teaching assistant at Columbia University in New York City. Later, he enrolled at the University of Colorado in Boulder, from which he received a PhD degree in biophysics in 1967.

From 1967 to 1969, Altman was a research fellow in molecular biology at Harvard University in Cambridge. In 1969 and 1970, he worked in the group headed by Drs Sydney Brenner (1927-) and Francis Crick (1916-2004) at the Medical Research Council Laboratory of Molecular Biology, University of Cambridge, England. In 1971, he joined the biology department of Yale University in New Haven, Connecticut, and rose from assistant professor to full professor in 1980. From 1983 to 1985, he was department chair at Yale University, and from 1985 to 1989, he was Dean of Yale College.

In 1982, Thomas Cech, working at the University of Colorado in Boulder, had shown that RNA sometimes served as a biocatalyst—a role previously believed to belong exclusively to proteins. Cech's work was related to a reaction in which the RNA was a self-catalyst.

Altman investigated other catalytic activity of RNA. He worked with ribonuclease-P (an enzyme composed of RNA and a protein), which catalyzes the processing of transfer RNA. Both the protein and RNA were thought to be necessary for the enzyme to work at the cellular level. Altman found that, in vitro, ribonuclease-P alone could splice the transfer RNA molecule at the correct site. The unaccompanied protein showed no such activity.

The final proof of Altman's work came when a recombinant RNA template was used to produce only the RNA part of ribonuclease-P. The artificial RNA still catalyzed the appropriate activity without any associated protein. Altman's work undercut the dogma that molecules could either carry information, like RNA, or catalyze chemical reactions, like proteins, but could not do both. For this work on ribonuclease-P, Sidney Altman was awarded a share of the 1989 Nobel Prize for chemistry. In 2001, the islands of Antigua and Barbuda issued a stamp (Scott No. 2518d) to honor Sidney Altman.

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