

RNA World

It is hypothesized (and is the subject of research in Bartel's lab) that RNA preceded DNA and protein. Since it has been shown that RNA molecules can possess specific binding and catalytic properties, the idea of an "RNA world" is plausible. In the RNA world, life forms were dependent upon RNA molecules to play all major roles, including those important in heredity, the storage of information, and the promotion of specific reactions - that is, biosynthesis and energy metabolism.

RNA replication is much simpler than DNA replication. RNA requires only one enzyme to be replicated, RNA polymerase. DNA, however, requires many enzymes to be replicated. In addition, it takes many enzymes and other molecules to make protein (transcription) - indeed, many of these are themselves RNA. For example, ribosomes are made primarily of RNA, and of course so are tRNAs. Thus, it is logical that at one point, genetic material was encoded solely by RNA and RNA was also used in a similar fashion as proteins. Eventually, the more stable DNA and protein evolved, and life forms no longer had to depend solely upon RNA.