The many roles of RNAs in Life: „The RNA world"

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(http://www.mfpl.ac.at/index.php?cid=72)

The central dogma of molecular biology suggests that biological information is stored in DNA then flows via RNA into proteins, which execute the functions dictated by DNA. DNA is thought to be the "molecule of life". With the discovery that ribonucleic acid (RNA) can store genetic information and execute catalytic and regulatory functions, the central dogma is now being challenged. RNA might be at the centre of life, at its origin, driving evolution and regulating cellular activities until today. The RNA world theory proposes that an RNA-based life predated today's DNA and proteins dominated cellular metabolism.

I will present the current knowledge on the many functions RNA molecules have in controlling cellular metabolism. RNA has an unprecedented structural flexibility and diversity. It is a dynamic molecule, which adopts a large variety of structures. I will further explain the catalytic potential of RNAs. A potent method, called SELEX, enables the isolation and selection of RNA molecules with desired functions and opens the potential for design of therapeutic molecules.

Just recently, a new class of RNAs have been discovered, the microRNAs, which regulate development through the modulation of gene expression. The RNAi pathway is being used as a research tool and has great therapeutic potential.

Links for further reading:

RNA world hypothesis: http://en.wikipedia.org/wiki/RNA_world_hypothesis

SELEX: http://de.wikipedia.org/wiki/SELEX

RNAi: http://en.wikipedia.org/wiki/RNA_interference

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