Experimental synthesis of nucleosides under conditions modelling the Earth's reduced initial atmosphere.

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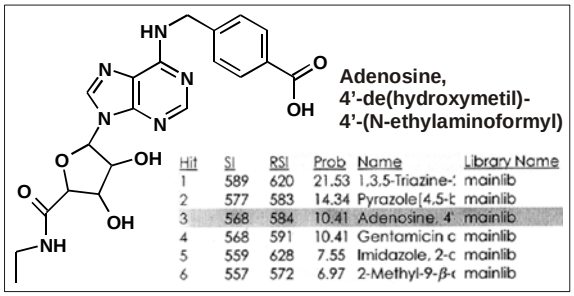
Proceeding from the concept of a key role of ATP in prebiological evolution [1] we have set some experiments to synthesize compounds which could be structurally close to ATP or to be its direct precursors. For the purpose of modelling of prebiological synthesis conditions we have selected CH_4 and N_2 system with small addition of oxygen (0,1 %) in some experiments. Reactions were initiated with impulses of the electric discharge of energy 0,1-0,2J and impulse duration <100 nsec. at frequency 10 Hz.

We have identified more than 100 organic compounds in the products of the experiments, including alkene and alkincianides, amines, aromatic and heterocyclic compounds. In strongly reduced mixture adenine derivates were synthesized, while ethers of purinole, inosine, guanine, xanthine, adenosine isomers and derivatives were synthesized in addition of oxygen. Adenosine was synthesized with noticeable probability.



The results of sugars synthesis (and D-Ribose) and nucleosides from the gas phase, reported here represent a significant interest. D-Ribofuranose, D-Arabinofuranose, D-Deoxyribofuranose, and some other sugars are identified in the form of etherified derivatives. The fact of a prevailing output of D-sugars forms is surprising. Thus, synthesis the nucleinic bases and some nucleosides, which are the parts of ATP and nucleinic acids at gas-phase synthesis, are possible.

References

[1] Galimov E.M. (2004) *Origin Life Evol. Biosph.* **34**, 599-613.