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#### ORIGIN OF NUCLEIC ACIDS

The appearance of nucleic acids is the first event after the birth of membranes which made it possible to assure the perennality of information. The complexity of these molecules has led some scientists to propose that they were not prebiotic but rather derived a more simple and achiral primitive ancestor. This hypothesis suggests that ribose possesses properties that allowed the formation of certain polysaccharides which evolved to RNA.

The first step of the hypothesis is the selection and concentration of ribofuranose. This sugar has chelating properties and its alpha-ribofuranose is favoured in the chelating position. The density of the sugar with a heavy cation is greater than water and thus the complex can escape the UV radiation at the surface of the ocean. The particularity of ribose is to be able to form a homochiral regular array of these basic chelating structures with pyrophosphate. These arrays evolve towards the formation of polysaccharides (poly ribose phosphate) which have a very organized structure. These polysaccharides in turn evolve to RNA by binding of adenine and deoxyguanine which are HCN derivatives that can react with the polysaccharides. The primitive RNA is methylated and oxidized to form prebiotic RNA with adenosine, cytidine, 7methyl-guanosine and ribothymidine as nucleic bases.

The pathway of biosynthesis of DNA from RNA will be studied.

I suggest that the appearance of DNA results from the interaction between prebiotic double stranded RNA and proteins. DNA could be a product of RNA degradation by proteins. The catabolism of RNA to DNA requires a source of free radicals, protons and hydrides. RNA cannot produce free radicals, which are provided by the phenol group of the amino acid tyrosine. Protons are provided by the medium and hydrides are provided by 7-methyl-guanosine which can fix hydrides coming from hydrogen gas and donate them for the transformation of a riboside to a deoxyriboside. This pathway suggests that DNA appeared at the same time as RNA. Like oxygen gas, DNA was a useful waste.