

TT2 - Willie Taylor (National Institute for Medical Research - UK)

*Replication in the RNA World*

Sunday – 10:40-12:00

English (Translation provided by R. Dilão and R. Mondaini)

**Abstract:**

The RNA world hypothesis requires a ribozyme that was an RNA directed RNA polymerase (ribopolymerase). A model for this, based on the core of the large subunit of the ribosome, is developed further. The geometry of a potential active-site for this ribopolymerase suggests that it contained a cavity (now occupied by the aminoacyl-tRNA) and that an amino acid binding in this might have “poisoned” the ribopolymerase by cross-reacting with the nucleoside-triphosphate before polymerisation could occur. Based on a similarity to the active site components of the class-I tRNA synthetase enzymes it is proposed that the amino acid could become attached to the nascent RNA transcript producing a variety of amino-acylated tRNA-like products. Using base-pairing interactions, it is suggested that some of these molecules might cross-link two ribopolymerases giving rise to a precursor of the modern ribosome with two subunits linked by tRNA. A hybrid dimer, half polymerase and half proto-ribosome, could account for mRNA translocation before the advent of protein elongation factors. Some implications for the genetic code are discussed.