TAM conference abstract template

**Title (Max. 150 characters)**

The Role of Proteins in the Origin of the Genetic Code

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**Abstract** (Max. 200 words)

Proteins are often over-looked in research focused on the origin of life and the development of the genetic code. The RNA World Hypothesis supposes that nucleic acids can replicate alone and simply incorporate proteins later on to speed up the process.

The aminoacyl-tRNA synthetases (aaRSs) are enzymes which assist the attachment of amino acids to tRNA molecules, effectively translating the genetic code into functional proteins (like the enzymes themselves) which then propagate the replication of the genetic code.

There are two classes of aaRSs based on the core structures of the molecules. Class I and Class II aaRSs have distinct structures and ways of interacting with tRNA, which differ greatly between the two classes but are universally shared across all domains of life within each class. Life is estimated to have come about 4 or more billion years in the past and yet these internal structures have been remarkably conserved to present-day. Using structural alignment, we can investigate the evolutionary signals preserved in the aaRS cores – which are believed to represent the ancestors of modern-day aaRSs – and gain insight into the organisation of the genetic code.