

Biochemistry/Bioinformatics Seminar

219 Brown Laboratory

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Protein archeology: How proteins emerged and evolve?



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Since their emergence about 3.7 billion years ago, proteins have been key to life as we know it. But how did they emerge and continue to evolve? The straightforward path, involving the addition of one amino acid after another—starting from scratch, is bound to fail, as the vast majority of such arbitrary strings can't even form stable structures, which are essential to function. Therefore, instead, evolution follows a cut-and-paste approach, where amino acid segments from existing proteins are grafted and stitched together to form new proteins. We know this, because the latter approach leaves traces, in the form of reused segments. By tracing these, we aim to decipher the origin of proteins, similarly to archeologists tracing human history. The talk will mainly cover the work published in Nepomnyachiy et al., PNAS 2014 (PMID: 25071170) and 2017 (PMID: 29078314), and current continuation.



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