

# BDR SEMINAR via Zoom

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**Thursday, April 28, 2022**

16:00-17:00

Zoom meeting URL will be announced on the event day by e-mail.

※Non-BDR members: Please register from the following link.

<https://krs1.riken.jp/m/bdrseminarregistration>

## Prebiotic peptide bond formation by the protoribosome: a missing link between RNA and protein dominated world

### Summary

High-resolution structures of ribosomes from various prokaryotic and eukaryotic organisms, determined by us and elsewhere, indicated that peptide bonds are created in the peptidyl transferase center (PTC), a semi-symmetrical RNA-made pocket, located in the core of the otherwise asymmetric ribosome. The three-dimensional structure and the nucleotide sequence of this region are highly conserved among all domains of life, hinting at its prebiotic origin and implying that it is a remnant of a prebiotic entity. In addition to the findings that RNA can self replicate and possess catalytic activities, these characteristics led to our "protoribosome" hypothesis. As a result of extensive studies, we recently provided an experimental proof of this concept via the successful peptide bonds formed using our *in vitro* synthesized constructs of such RNA pockets between relevant minimal substrates, detected using MALDI and MS techniques. Hence, it is conceivable that this entity, which existed in the RNA-dominated world, represents the origin of the ribosome, thus also the origin of life. Accordingly, as we suggested, the protoribosome is the missing link between the RNA-dominated world and the contemporary protein/nucleic acids life.



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