# Cologne Evolution Colloquium

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## Bacterial retrons a new type of phage defense systems

The foundations of molecular biology have been established in the mid of the 20th century by studying bacteriophages, the viruses of bacteria. Restriction-modification systems and CRISPR, tools that have propelled genetic engineering, are systems that bacteria use to defend against phage attack. Yet, only recently we have started to understand how extensive and diverse are interactions between bacteria and phages. Myriads of bacterial immunity systems are being identified, many being the origins of eukaryotic innate immunity systems, and phages seem to have come up with even more ways to circumvent them. We have recently identified that the enigmatic bacterial retrons, the first prokaryotic elements discovered to encode a reverse transcriptase, act as phage defense systems. Bacterial retrons encode tripartite toxin-antitoxin systems, which use the complex of the reverse transcriptase with its DNA product both as antitoxin and as a sensor of phage protein activities. As response, they help the attacked cell to defend via abortive infection. Here, I will provide evidence on how these systems work and evolve to sense different phage activities, as well as how phages try to circumvent them.

Wednesday, November 16, 2022, 17:00
Institute for Biological Physics Room 0.02
Hosted by Tobias Bollenbach

CRC 1310 Predictability in Evolution