



# Karl Friedrich Bonhoeffer Lecture

Thursday, 9<sup>th</sup> July 2015 - 5 pm

Manfred Eigen Hall,  
Max Planck Institute  
for Biophysical Chemistry

Am Faßberg 11, 37077 Göttingen



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## **RNA-Protein (Ribonucleoprotein) Assemblies in Control of Gene Expression**

Protein-coding messenger RNAs (mRNAs) in eukaryotes are produced from pre-mRNAs (historically called hnRNAs) by extensive processing, including removal of introns by splicing and 3'-end cleavage and polyadenylation. Pre-mRNA processing commences at active chromosomal transcription sites (genes) and is mediated by two major classes of cellular components: RNA-binding proteins (RBPs) that form specific RNA-protein (ribonucleoprotein; RNP) complexes and non-coding small nuclear RNAs, also in the form of RNPs (snRNPs), which are the major subunits of the splicing machinery (spliceosomes). The resulting supra-molecular RNPs give chromosomes in some cells (e.g., amphibian oocytes), a striking lampbrushes-like ("lampenzylinderputzer") appearance, noted by 19<sup>th</sup> century cytologists. But their main constituents, the RBPs, remained unidentified for another century. The discovery of RBPs, their biochemical properties and signature sequences, revealed them to be one of the largest protein clads with function in every aspect of RNA biology. Recent studies advanced understanding RNP assembly, the molecular basis of many diseases caused by RNP perturbations, and described an overarching U1 snRNP-dependent gene expression regulation mechanism.