

# Einladung

zum **außerplanmäßigen**

# Botanischen Kolloquium

**Freitag, den 22. September 2017, 12 c.t.**

Nussallee 4, Hörsaal Botanik

**Referent:** Prof. Ian Small

*The University of Western Australia*

**Thema:** „*Natural and synthetic proteins for controlling RNA processing in plant organelles*”

Synthetic biology is moving beyond the design of single proteins into systems-level projects involving the design of complete pathways. This will require the development of sequence-specific factors with the ability to control the expression of large sets of genes or transcripts. Promising progress is being made in the study of a large class of repeated motif proteins that share one essential feature - their modular structure in which each motif contacts and recognises a single nucleotide. It is this modularity that makes them ideal targets for rational design. The largest family of this type are the pentatricopeptide repeat (PPR) proteins prevalent in plants [1]. PPR proteins operate in mitochondria and chloroplasts in post-transcriptional control of gene expression, and are essential for the expression of genes required for the construction and function of the major protein complexes involved in photosynthesis and respiration. In plants they are vital during germination and early seedling development and many are absolutely required for autotrophic growth. In humans, mutations in PPR proteins are associated with mitochondrial disorders. The discovery of a 'code' describing how PPR proteins recognize their target RNAs [2] allows the prediction of PPR binding sites and the construction of custom-designed proteins to bind desired targets. We (and others) have since predicted and verified the binding sites of many natural PPR proteins and shown that their target specificity can be predictably altered by single amino acid changes at key sites within each motif. Of particular interest in this context are the many thousands of RNA editing factors found in plants, each one capable of inducing highly specific single nucleotide changes to their RNA targets.

[1] Barkan, A. and Small, I., *Annu Rev Plant Biol* 65, pp. 415-442 (2014)

[2] Barkan, A., Rojas, M., Fujii, S., Yap, A., Chong, Y.S., Bond, C.S. and Small, I., *PLoS Genet* 8, e1002910 (2012)

**Diskussionsleitung:** Prof. Dr. V. Knoop, Dr. M. Schallenberg-Rüdinger, IZMB,  
Abt. Molekulare Evolution

Die Dozenten der Botanischen Institute

Zu diesem Vortrag und zu einer evtl. Nachsitzung sind Sie herzlich eingeladen