The faculty of Biotechnology and Food Engineering

PhD seminar

Bea Kaufmann

Triplex formation – the third wheel with power

The seminar will be held in English

Abstract:

Nature provides a tremendously rich toolbox of dynamic nucleic acid structures that are widespread in cells and affect multiple biological processes. With the technological advances in deep sequencing, non-canonical structures gained renewed scientific interest. One particularly intriguing form of such structures is the formation of triple helices (triplexes). It involves three nucleic acid strands and a mix of Watson&Crick as well as other hydrogen bonds. Despite extensive research *in vitro*, the underlying rules for triplex formation remain debated and evidence for such triplexes *in vivo* is circumstantial. Here, I will talk about the development of multiple deep-sequencing platforms to systematically refine the triplex code. To do so, I designed large libraries of short, single-stranded oligos containing putative triplex-forming sequences, selectively enriched (Triplex-Seq), or ligated these oligos to genomic DNA in close proximity (Triloci-Seq), and subsequently analyzed the enriched sequences. Applying the Triplex-Seq approach, I identified a preference for triplex formation in neutral compared to acidic pH and an enrichment for guanines both in the single-strand and surprisingly also in the double-stranded counterpart. While the Triplex-Seq platforms enable the direct identification of the single-strand, preliminary results of the Triloci-Seq approach point to the widespread occurrence of potential triplex-target sites throughout the genome. In summary, I believe that my results demonstrate the power of deep-sequencing platforms to explore triplex formation and build upon a growing interest in using DNA structures for biotechnological applications.

Monday, 03.09.18, 14:00 – 15:00, Vizin Room, Faculty of Biotechnology and Food Engineering