Core cross-linked polymeric micelles based on polypept(o)ides: from secondary structure formation of polypeptides to functional cross-linking strategies for polymeric micelles

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1. Secondary structure formation affects the ring-opening polymerization of *N*-carboxyanhydrides and governs the self-assembly of thiol-reactive amphiphilic block copolypept(o)ides. (This thesis)
2. Controlled self-assembly and purification remain the bottlenecks for the larger-scale production of core cross-linked polymeric micelles and can be addressed by micromixers and cross flow filtration techniques. (This thesis)
3. Functional core architectures allow for the conjugation of pro-drugs referring to redox-potential, pH value or irradiation as stimuli for drug release from polymeric micelles. (This thesis)
4. Release of the co-factor iron from stimuli-responsive core cross-linked polymeric micelles can induce activation of macrophages that directs for a novel class of therapeutics to resolve pathologic immune tolerance mechanisms. (This thesis)
5. Polypept(o)ides are a novel class of polymers with functional side- or end-groups based on endogenous amino acids providing a platform technology for technical and biomedical applications. (adapted from Klinker and Barz *Macromol. Rapid Commun.* 2015)
6. Nanomedicine can improve the pharmacokinetic profile of active pharmaceutical ingredients and enable the use of degradation-sensitive drugs and drug combinations. (adapted from Anselmo and Ferrari *Bioeng. Transl. Med.* 2019)
7. Therapeutic cargo and drug delivery technology dynamically influence each other and need to be adjusted to ensure effective delivery and release of the active pharmaceutical ingredient. (adapted from Owen *et al. Nano Today* 2012)
8. The investigation of drug delivery systems requires a diverse subset of analytic techniques as well as clinically relevant *in vitro* and *in vivo* models for proof-of-concept testing. (adapted from de Lázaro *et al. Nat. Mater.* 2021 and Barenholz *J. Control. Release* 2012)
9. Interdisciplinary research relies on communication and finding a common language of understanding.
10. Learning the local language provides the basis for integration into society.
11. Music, sports, family, and friendship together have the power to inspire innovative research and guide to success on long-term aims.