

Pseudo-proteins: design and biomedical applications

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Among the naturally occurring biodegradable polymers, applied for biomedical purposes, proteins are taken a leading position – they are suitable for both surgical and pharmaceutical applications owing to their innate affinity to tissues, enzymatic biodegradability with releasing α -Amino Acids (α -AAs) which could be assimilated by the organism promoting in that way tissue regeneration. However, the proteins have some serious shortcomings among which the most important is immunogenicity that is attributed to their molecular architecture. New generation of α -AA based biodegradable polymers, so-called “Pseudo-Proteins” (PPs) have a new macromolecular architecture less recognizable by the immune system of the living organism. The key monomers to build up PPs are diamine-diester monomers made of α -AAs and diols. Several classes of PPs both regular and functional ones having the widest range of material properties have been designed. PPs, like proteins, release α -AAs upon the biodegradation and could be considered for numerous sophisticated biomedical applications in regenerative medicine, pharmacy, etc.

Nino Zavrashvili is an assistant professor at the Agricultural University of Georgia and a senior research scientist at the Institute of Chemistry and Molecular Engineering of the same University. She received PhD degree (2008) from the Georgian Technical University at the Faculty of Chemical Technology and Metallurgy. In 2010–2011–2012 (one month each year) she worked at the EPFL in Lausanne (# IZ73ZO_128071/1 supported by Swiss NSF). In 2015–2016 she worked as a visiting scholar during 8 months at the CPBN, Northeastern University (Boston, MA, USA) (SRNSF #04/41 and GRDF/CRDF Global #A6069). In 2017–2018 and 2018–2019 (For eight months and five months, accordingly) Nino was postdoctoral fellow at Hokkaido University, ICAT (Prof. T. Nakano's lab). Nino has received both the Georgian and US patents. Her research interests include the synthesis and study of biodegradable and biocompatible polymers on the basis of naturally occurring and nontoxic building blocks, recently she has been engaged in the design and study of multifunctional cationic polymers for numerous biomedical applications. Hobbies: Playing musical instruments, painting, cooking etc.

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