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Pseudo-proteins: A new family of biodegradable polymers for sophisticated biomedical applications

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Proteins are one of the most appropriate biomaterials for a variety of biomedical applications including resorbable surgical and pharmaceutical devices 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. We have developed a new generation of α-AA Based Biodegradable (AABB) polymers having a new macromolecular architecture less recognizable by the immune system of the living organism. The key monomers to build up the macromolecules of the new architecture are diamine-diester monomers made of α-AAs and diols. Several classes of AABB polymers both regular and functional ones having the widest range of material properties have been designed. The AABB polymers, like proteins, release α-AAs upon the biodegradation and could be considered as pseudo-proteins suitable for numerous sophisticated biomedical applications in regenerative medicine, pharmacy, etc.

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