Functionalized Biodegradable Polymers for Smart Biomaterials

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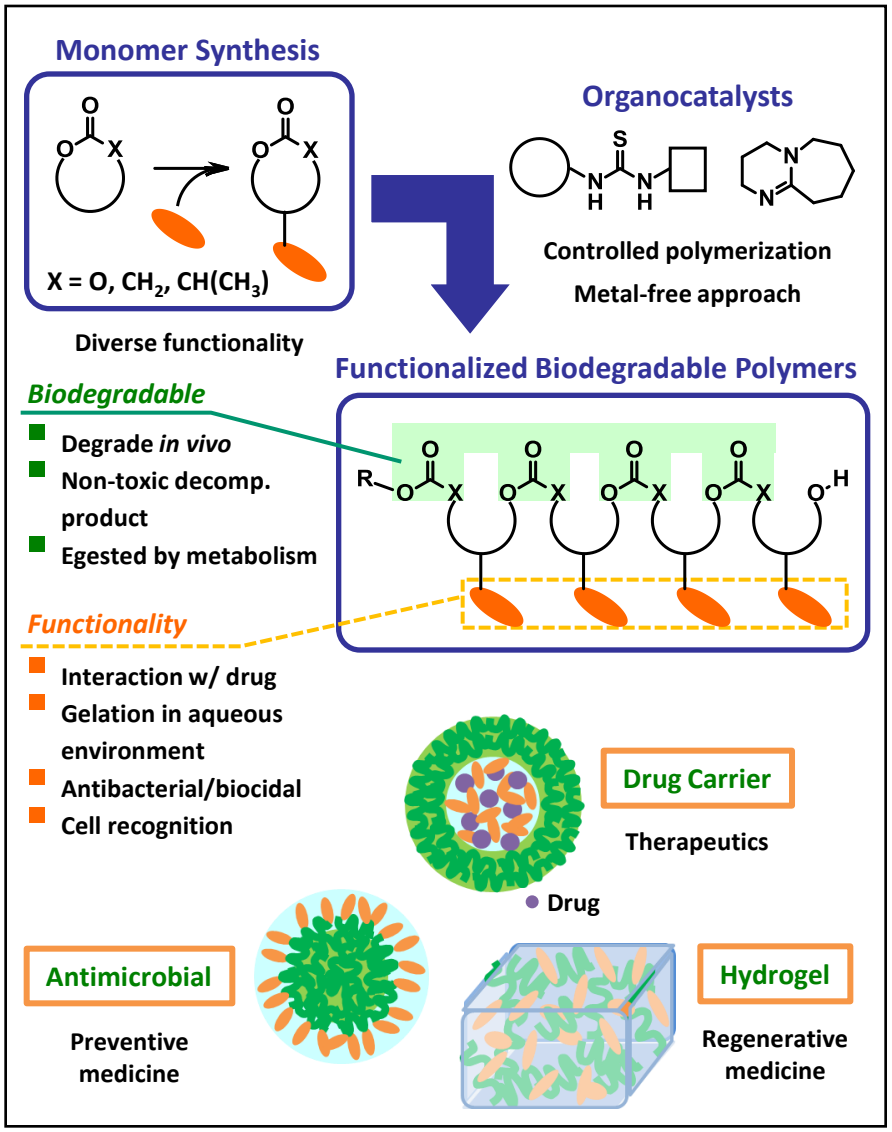

Content:

'Biodegradable polymers' primarily comprise aliphatic alkyl chain and ester, amide, carbonate, and urethane bonds, and thereby the linkages are easily decomposed *in vivo* through enzymatic or non-enzymatic hydrolysis. The decomposition products are barely toxic and egested by metabolism. The polymers are therefore suitable for medical devices embedded in body for a short/middle term. We are working on synthesis of cyclic esters and carbonates with diverse functionalities and their ring-opening polymerization (ROP) to develop advanced biomedical devices for application in drug carriers, hydrogel, and antimicrobials. In the polymer synthesis we use 'organocatalysts' to offer metal-free synthetic pathways, which allows our approach compatible with body in terms of both materials and methodology. The organocatalytic ROP also enables controlled (living) polymerization for tuning the macromolecular structure in nano scale, in order to regulate material properties in use of the materials above mentioned *in vivo*. We are also involved in seeking new organocatalysts for generating biodegradable polymers and applying supramolecular assembly to biomedical device.

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