Bacterial amyloids for materials sciences and biomedicine

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Inclusion bodies are insoluble, submicron protein aggregates commonly found in recombinant bacteria, that represent a well-known bottleneck in the production of soluble protein species [1]. These protein clusters are composed by a network of non-toxic amyloid fibers, that confer structural stability, and non-amyloidal protein forms, that adopt quasi-native conformations and keep their functionalities [2]. Both physicochemical properties and biological activity of inclusion bodies can be modulated by culture conditions or through the selection of the genetic background of the producing bacteria. Therefore, these protein particles have resulted very appealing as functional biomaterials in biomedicine [3] or as self-immobilized enzymes in biotechnology [4]. The fact that inclusion bodies can be produced in GRAS bacteria such as *Lactococcus lactis* [5], combined with the discovery that the embedded protein is slowly released from the material in a fully functional form [6], have opened a spectrum of applications of these bacterial amyloids as unexpected drug delivery systems [7].

References

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