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Growing of apatite particles on surfaces of natural rubbers and their effects on blood wettability

This work addresses a study of the interaction between hybrid Natural Rubber (NR) surfaces and a Simulated Body Fluid (SBF) aiming to access desirable properties to exploit the applications as bioactive coatings. The surfaces were physico chemically modified during 30 days in contact with SBF. The formation of calcium phosphate particles on NR coatings occurs due to the electrostatic interaction between negatively charged layer along the NR surface (– 57 mV) and Ca^{2+} thus inducing the nucleation of Ca based salts, especially with phosphate ions (PO_4^{3-}). The apatite then grew spontaneously accompanied by consuming the calcium and phosphate ions. Various ions (e.g., Ca^{2+}, $CaOH^{+}$, PO_4^{3-}, HPO_4^{2-} and CaH_2PO^{4+}) on the surfaces can enable the adsorption ability of the protein and some chemicals in the human blood. The increase of the blood wettability was attested by contact angle and contact radius measurements. On the other hand, the hybrid NR coating exhibited both stability and biodegradability in different levels (time dependence). These features make the material a candidate for tissue engineering, for instance to provide a functionalized surface applicable as an occlusive membrane, bioactive coating and (or associated with) scaffolds.

Biography

Rodney Marcelo do Nascimento has completed his PhD in 2011 from Universidade Estadual Paulista UNESP, Brazil and Postdoctoral studies from Université Claude Bernard Lyon, France in 2015. He has published nine papers as first author in reputed journals and has been serving as a Reviewer Board Member of the *International Journal of Nanomedicine* since 2017. He has received an award in Surface Engineering from the National Institute of Surface Engineering – Conselho Nacional de Desenvolvimento Científico e Tecnológico-CNPq, Brazil, 2013. Currently, he works in the development and hybrid materials using natural polymers and bioactive particles for biomedical applications in University of São Paulo.

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