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Development, characterization and biological evaluation of novel glass-like coatings for cardiovascular implant application

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Introduction: Glass-like coatings are used due to their excellent properties in a broad application field like drug delivery systems or as implant coating for bone repair. However these glass-like coatings can only be generated at relatively high temperatures that limit their application in temperature-sensitive areas. Therefore, new developments and further research is going on to provide useful coatings also in these fields, e.g., as coating for cardiovascular implants.

Methods: Two glass-like coatings have been developed and characterized. These coatings have been applied using the well-known sol-gel-technique and tempered at moderate temperatures in different atmospheres. Afterwards the biocompatibility using human umbilical vein endothelial cells (HUVEC) has been investigated.

Results: The developed glass-like coatings possess excellent optical, chemical, and biological properties. By altering the existing sintering atmosphere, the cellular growth could be selectively influenced in a positive and a negative way. Additionally the coatings have been proven to be of radiolucent nature that makes them attractive for different fields.

Conclusion: The developed glass-like coatings are promising coatings for a later cardiovascular application. A later usage as closing layer on thin, fine, and sensitive wires like stents is cogitable. First and foremost these coatings can contribute in a better acceptance of an implant in the human body.

Biography

M Amlung has completed his PhD in 1998 in Chemistry at Saarland University and has been working since 1996 at INM – Leibniz-Institute for New Materials in Saarbruecken as Scientific Officer.

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