Synthesis of Osteoinductive Glasses by Immobilization of rhBMP-2
K. Zurlinden\(^1\), M. Laub\(^1\), M. Lindner\(^2\), K. Koczur\(^2\), A. Kirsten\(^2\), A. Oliveira\(^3\), G. Seifert\(^1\), S. Gemming\(^4\), C. Müller-Mai\(^5\), H. Fischer\(^2\), H.P. Jennissen\(^1\)

\(^1\) Institut für Physiologische Chemie, Universität Duisburg-Essen, Universitätsklinikum Essenm Germany
\(^2\)Zahnärztliche Werkstoffkunde und Biomaterialforschung, Universitätsklinikum RWTH Aachen, Germany
\(^3\)Fachbereich Chemie, Arbeitsgruppe Theoretische Chemie, TU Dresden, Germany
\(^4\)Institut für Ionenstrahlphysik und Materialforschung, FZ Dresden-Rossendorf, Germany
\(^5\)Unfallchirurgie der Chirurgischen Universitätsklinik, Knappschaftskrankenhaus Bochum-Langendreer, Germany

Corresponding Author e-mail: hp.jennissen@uni-due.de

Introduction
Bioglass (45S5 glass), introduced by Hench in 1969, corresponds to an osteoconductive [1] bioresorbable [2] material. Osteoconductive surfaces have been termed biopassive [3] in contrast to bioactive rhBMP releasing surfaces [3]. Thus it was the aim of this work to bestow osteoinductivity to a biopassive glass surface by immobilizing rhBMP-2.

Materials and Methods
Amorphous glass of 45S5 specification (Ra ~ 0.9) was prepared in polished miniplate form (5 x 10 x 1 mm). A hydrophilic surface was created with chromosulfuric acid (CSA) [4] (\(\theta\) ~ 10\(^\circ\)), a hydrophobic surface (\(\theta\) ~70-80\(^\circ\)) with amino-propyltriethoxy silane (APS) [5]. rhBMP-2 which contains hydrophilic and hydrophobic patches [6] was adsorbed on both surfaces, its activity was tested according to ref. [7].

Results
As shown in Fig. 1 (ordinate), rhBMP-2 is

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\text{Immobilized rhBMP-2} = \begin{cases} 9 & \text{Bioglass CSA} \\ 6 & \text{Bioglass control} \\ 4 & \text{Bioglass CSA + APS-mod.} \\ 0 & \text{Bioglass control} \end{cases}
\]

\(\text{Time [d]}\)

**Fig. 1**
Release of rhBMP-2 from the surface of highly polished amorphous bioactive glass.

Discussion and Conclusions
rhBMP-2 was immobilized by adsorption in high amounts of 7-8 \(\mu\)g/cm\(^2\) on self-prepared bioglass of 45S5 specification. The released rhBMP-2 is biologically highly active indicating the successful synthesis of an osteoinductive glass.

References