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Quantification of various growth factors in different demineralized bone matrix preparations[†]

B. Wildemann ✉, A. Kadow-Romacker, N.P. Haas, G. Schmidmaier

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Abstract

Besides autografts, allografts, and synthetic materials, demineralized bone matrix (DBM) is used for bone defect filling and treatment of non-unions. Different DBM formulations are introduced in clinic since years. However, little is known about the presents and quantities of growth factors in DBM. Aim of the present study was the quantification of eight growth factors important for bone healing in three different "off the shelf" DBM formulations, which are already in human use: DBX putty, Grafton DBM putty, and AlloMatrix putty. All three DBM formulations are produced from human donor tissue but they differ in the substitutes added. From each of the three products 10 different lots were analyzed. Protein was extracted from the samples with Guanidine HCL/EDTA method and human ELISA kits were used for growth factor quantification. Differences between the three different products were seen in total protein contend and the absolute growth factor values but also a large variability between the different lots was found. The order of the growth factors, however, is almost comparable between the materials. In the three investigated materials FGF basic and BMP-4 were not detectable in any analyzed sample. BMP-2 revealed the highest concentration extractable from the samples with ~3.6 μg/g tissue without a significant difference between the three DBM formulations. In DBX putty significantly more TGF-β1 and FGFa were measurable compared to the two other DBMs. IGF-I revealed the significantly

highest value in the AlloMatrix and PDGF in Grafton. No differences were accessed for VEGF. Due to the differences in the growth factor concentration between the individual samples, independently from the product formulation, further analyzes are required to optimize the clinical outcome of the used demineralized bone matrix. © 2006 Wiley Periodicals, Inc. J Biomed Mater Res, 2007

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