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**Incorporation of rh-BMPs (Bone Morphogenetic Proteins) in Electrospun Bone Tissue
Engineering Scaffolds for Cleft Palate Repair**

Bone is unique in that it retains a remarkable ability to undergo complete regeneration following injury even in adults, as evident in fracture healing. However, there are conditions where this inherent healing capacity falls inadequate and external intervention in terms of grafting becomes necessary. Autografts are considered gold standard due to the most favorable outcome, but serious limitations exist: limited supply, donor site morbidity, second surgery and cost. Bone tissue engineering is an emerging strategy that attempts to synthesize a substitute for autografts, by generating scaffolds that contain osteoinductive bone morphogenetic proteins (BMPs). Electrospinning is a popular scaffold fabrication strategy in tissue engineering and typically involves the use of organic solvents. Even though organic solvent exposure can potentially denature BMP and render them inactive, there are no studies/ assays to test this hypothesis. The present study investigated this important interaction by developing two complementary quantitative assays: slot blot assay and Id-1 luciferase assay of biological activity. We used three different isoforms of BMP- homodimeric BMP-2, BMP-7 and heterodimeric BMP-2/7. The slot blot assay was specific to the BMP isoform, sensitive to 15 ng and was able to detect the BMP after solvent exposure. Exposure of BMPs to organic solvents resulted in significant loss of biological activity in the luciferase assay; however, dilution of organic solvent with aqueous buffer resulted in regaining all lost biological activity. Overall, we have successfully developed quantitative assays to study solvent-BMP interaction and identified a successful strategy to ensure retention of their biological activity after electrospinning.