The Effect of Trace Elements on Bioceramic for Enhancing Bone Engineering

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This project is to discover the effect of trace elements on a calcium phosphate bioceramic and to determine the trace elements that best reacts with calcium phosphate to produce the strongest material, which is able to assist with bone formation and bonding. The hypothesis which stated if trace elements are added to calcium phosphate bioceramics, then data will show that the bioceramic containing zinc will withstand the most stress, was tested by adding the trace elements: zinc, copper, manganese, strontium, and lithium to the amorphous calcium phosphate bioceramic in the form of a paste. Then the bioceramic paste was spread onto a chicken bone with a cut made halfway through the bone. After bioceramic application, the chicken bones were tested using an S-hook connected to a force meter to determine the maximum force needed to break the bones. The variables were: dependent-amount of stress, independent-the trace elements added, and controls-type of bioceramic, type of bone, amount of bioceramic, and amount of trace elements. During the experimentation, it was observed that the zinc bioceramic withstood the most stress, and the manganese bioceramic withstood the least stress. Based on the ten trials, zinc was the best bioceramic additive, the average amount of stress withstood by the bone coated with zinc-bioceramic was 37.3 Newtons. The manganese-bioceramic was the worst with an average of 26.8 Newtons. The data and results supported the hypothesis, which show that the zinc bioceramic withstood the most stress.

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