Is Honeybee Silk Antimicrobial?

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The dream of living forever, only accomplishable by replacing broken parts of the human body, is closer than it has ever been before. Fulfilling this dream requires biomaterials: organic or synthetic materials to replace, or act with body tissue or organs. Current biomaterial are associated with high infection rates, with infection causing enormous discomfort to the individual and high healthcare costs for countries. There is a need for new biomaterials which have antimicrobial properties, to reduce or stop the infection associated with these materials. Honeybees produce a type of silk, very different from that produced by spiders and silkworms, that has features similar to features of antimicrobial peptides. This study identified the most probable antimicrobial peptides in the honeybee silk and tested if these peptides inhibited the growth of bacteria. The antimicrobial activity of these peptides was tested by mixing the peptides with a solution of E. coli cells and after an overnight incubation E. coli growth media was added and the optical density measured hourly to determine the growth curve of the remaining bacteria. Certain honeybee silk peptides caused flocculation and one peptide was antimicrobial. All of the peptides that had activity against the bacteria were located in the same area of the silk protein. Possibly this material can be used for biomaterial development. The study supports the hypothesis: the presence honeybee silk peptides causes a delay in the growth of a bacterial culture.

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