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New peptide for the promotion of cell adhesion/cell growth

Researchers from the University of Bern found that a surface of choice, e.g. Titanium or a biocompatible polymer, can be provided with cell adhesive and growth promoting capacity by attaching oligomers of a small, defined sub-domain of the Ameloblastin (AMBN) molecule. The relevant sub-domain sequence consists of only 13 amino acids, thus molecules which are fully accessible through synthetic, industrially practicable means. This finding opens a new approach for e.g. coating medical implants.

Keywords osseointegration, tissue growth, wound-healing, implant, micro-gap

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Background It has long been known that AMBN promotes the cell adhesion to surfaces. AMBN accelerates the formation of bone and tissue through the attraction of various types of cells such as osteoblasts and fibroblasts from the surrounding tissues.

Invention This invention provides the advantages of AMBN without the need for the whole protein but only for small and stable peptide chains. The inventors identified a domain of AMBN of a mere 13 amino acids, which is responsible for the protein's capacity to attract cells and thus the stimulation of growth in bone and soft connective tissues. This domain or oligomers thereof can be attached to a e.g. Titanium surface showing a striking effect on cell adhesion (see Figure). The effect could not only be observed for osteoblasts but also for fibroblasts, smooth muscle cells and epithelial cells.

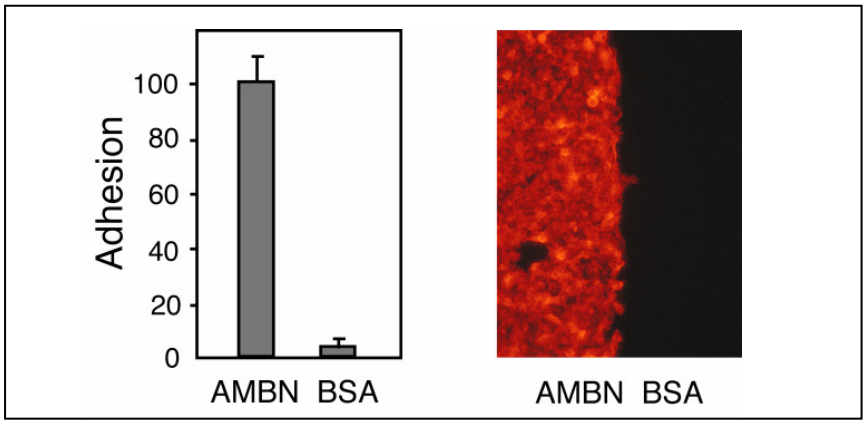

Figure: Adhesion of human osteoblast-like cells (red, stained for actin) on Titanium coated with ameloblastin polypeptide (left) compared to Titanium coated with bovine serum albumin (right)

Applications: Many different applications conceivable like e.g. coating of implant materials, pharmaceutical compositions containing the polypeptide according to the invention for wound-healing purposes, functionalization of artificial tissues and bone materials etc., in particular with strong promise to overcome the problematic formation of micro-gaps between soft and hard matters.

Patent Status Priority patent application filed

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