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(54) Title: BIOSYNTHETIC PROLINE/ALANINE RANDOM COIL POLYPEPTIDES AND THEIR USES

(57) Abstract: The present invention relates to a biosynthetic random coil polypeptide or a biosynthetic random coil polypeptide segment or biosynthetic conjugate, wherein said biosynthetic random coil polypeptide, said biosynthetic random coil polypeptide segment or said biosynthetic conjugate comprises an amino acid sequence consisting solely of proline and alanine amino acid residues, wherein said amino acid sequence consists of at least about 50 proline (Pro) and alanine (Ala) amino acid residues. Said at least about 50 proline (Pro) and alanine (Ala) amino acid residues may be (a) constituent(s) of a heterologous polypeptide or an heterologous polypeptide construct. Also uses and methods of use of these biosynthetic random coil polypeptides or polypeptide segments or said conjugates are described. The uses may, inter alia, comprise medical uses, diagnostic uses or uses in the food industry as well as other industrial applications, like in the paper industry, in oil recovery, etc. In particular, a drug conjugate is provided that comprises (i) a biosynthetic random coil polypeptide or polypeptide segment comprising an amino acid sequence consisting solely of proline and alanine amino acid residues, wherein said amino acid sequence consists of at least 50 proline (Pro) and alanine (Ala) amino acid residues, and (ii) a drug selected from the group consisting of (a) a biologically active protein or a polypeptide that comprises or that is an amino acid sequence that has or mediates a biological activity and (b) a small molecule drug. Furthermore, nucleic acid molecules encoding the biosynthetic random coil polypeptide or polypeptide segment and/or the biologically active, heterologous proteins as well as vectors and cells comprising said nucleic acid molecules are disclosed. In addition, the present invention provides compositions comprising the compounds of the invention as well as specific uses of the random coil polypeptide or polypeptide segment, the biologically active proteins, the drug conjugates or the nucleic acid molecules, vectors and cells of the invention. Also methods of producing and/or obtaining the inventive biosynthetic random coil polypeptides or polypeptide segments as well as of producing and/or obtaining the inventive biologically active, heterologous proteins, and/or polypeptide constructs or conjugates, like drug conjugates are provided.

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