SUMMARY ~~OF THE INVENTION~~

In one aspect, the present invention provides an isolated protein having phosphatase activity, wherein said protein comprises an amino acid sequence of at least 200 consecutive amino acids having at least 90% sequence identity with SEQ ID NO: 5, an amino acid sequence of at least 50 consecutive amino acids, having at least 90% sequence identity with SEQ ID NO: 6, and an amino acid sequence of at least 40 consecutive amino acids having at least 90% sequence identity with SEQ ID NO: 7, wherein the full length protein comprises an amino acid sequence having at least 90% sequence identity with the full length amino acid sequence of SEQ ID NO: 1, with the proviso that the amino acid at position 279 is leucine (L), the amino acid at position 328 is valine (V) and the amino acid at position 478 is leucine (L).

In another aspect, the present invention provides a polynucleotide comprising a nucleic acid sequence encoding a protein as described herein.

In yet another aspect, the present invention provides a vector comprising a polynucleotide as described herein.

In yet another aspect, the present invention provides a protein as described herein, a polynucleotide as described herein, or a vector as described herein, for use as a medicament.

In yet another aspect, the present invention provides a protein, polynucleotide or vector as described herein, for the prevention or treatment of a disease accompanied by a local or systemic zinc deficiency.

In yet another aspect, the present invention provides a protein, polynucleotide or vector for use as described herein, for the prevention or treatment of an inflammatory disease, a kidney disease or hypophosphatasia.

In yet another aspect, the present invention provides a host cell comprising a protein as described herein, polynucleotide as described herein or a vector as described herein.

In yet another aspect, the present invention provides a method for producing a protein as describe herein, comprising culturing the host cell as described herein and allowing the host cell to produce said protein.

In yet another aspect, the present invention provides a composition comprising a protein as described herein and/or obtainable by a method as described herein.

In yet another aspect, the present invention provides a composition as described herein for use as a medicament.

In yet another aspect, the present invention provides a composition as described herein for use in the prevention or treatment of disease accompanied by a local or systemic zinc deficiency, an inflammatory disease, a kidney disease or hypophosphatasia.

DETAILED DESCRIPTION

In a first embodiment, the invention provides an isolated protein having phosphatase activity, wherein said protein comprises an amino acid sequence of at least 200 consecutive amino acids having at least 90% sequence identity with SEQ ID NO: 5, an amino acid sequence of at least 50 consecutive amino acids having at least 90% sequence identity with SEQ ID NO: 6, and an amino acid sequence of at least 40 consecutive amino acids having at least 90% sequence identity with SEQ ID NO: 7, wherein the full length protein comprises an amino acid sequence having at least 90% sequence identity with the full length amino acid sequence of SEQ ID NO: 1, with the proviso that the amino acid at position 279 is leucine (L), the amino acid at position 328 is valine (V) and the amino acid at position 478 is leucine (L).

In a preferred embodiment, the full length protein comprises an amino acid sequence having at least 90%, at least 95%, or at least 98% sequence identity with the full length amino acid sequence of SEQ ID NO: 1, with the proviso that the amino acid corresponding to position 279 is leucine (L), the amino acid corresponding to position 328 is valine (V) and the amino acid corresponding to position 478 is leucine (L).

With the term "corresponding to" here, is meant the particular position, relative to the N-terminal amino acid of the mature protein, which is

designated “position 1”. The term “corresponding to” explicitly does not refer to the particular amino acid residue on that particular position.

The terms "protein" and "polypeptide" refer to compounds comprising amino acids joined via peptide bonds and may be used interchangeably.

As used herein, where "amino acid sequence" is recited it refers to an amino acid sequence of a protein or peptide molecule. An "amino acid sequence" can be deduced from the nucleic acid sequence encoding the protein. However, terms such as "polypeptide" or "protein" are not meant to limit the amino acid sequence to the deduced amino acid sequence, but can include post-translational modifications of the deduced amino acid sequences, such as amino acid deletions, additions, and modifications such as glycosylations and