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Oral Presentation

Zera®, a novel technology for stable accumulation and easy recovery of recombinant proteins in eukaryotic protein-production hosts

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Background

Subcellular targeting of proteins in host cells is one of the most important issues in protein production. Stability, folding, and post-translational modifications depend on where proteins are sorted. Besides secretion, ER appears as an efficient compartment to accumulate proteins, as demonstrated by the frequent use of K/HDEL fused to the C-terminus of a protein to retain and accumulate recombinant proteins in the endoplasmic reticulum (ER) of the cell hosts.

Results

We present a novel technology (Zera® assembler peptides) we have developed for recombinant protein production based on their *in vivo* accumulation in ER-derived artificial storage organelles. The Zera® peptide is a proline-rich domain of a plant storage protein with a) self-assembling and b) protein body formation properties. Zera® peptide, as a fusion partner of proteins of interest, reaches a conformation stage that induces the formation of novel dense organelles derived from the ER : Protein Bodies (PBs). The recombinant proteins remain stably accumulated within these PBs in host cells. A family of Zera® fusion proteins have been engineered and expressed in different eukaryotic systems such as yeast, mammalian cells and plants. In all systems, recombinant proteins accumulate in the newly formed PBs where they are protected from degradation. The high density of these organelles permits to implement optimized recovery and purification processes of the protein product, partially by achieving a ultra-high, pre-purification concentration or the product.

Conclusion

Our results indicate that the Zera® peptide is a powerful tool for both high accumulation of recombinant proteins in eukaryotic cells and their recovery from biomass.