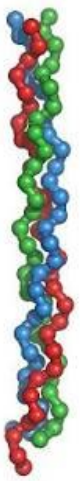
RECOMBINANT COLLAGENASES: RATIONALE

1. COLLAGEN AND COLLAGENASES

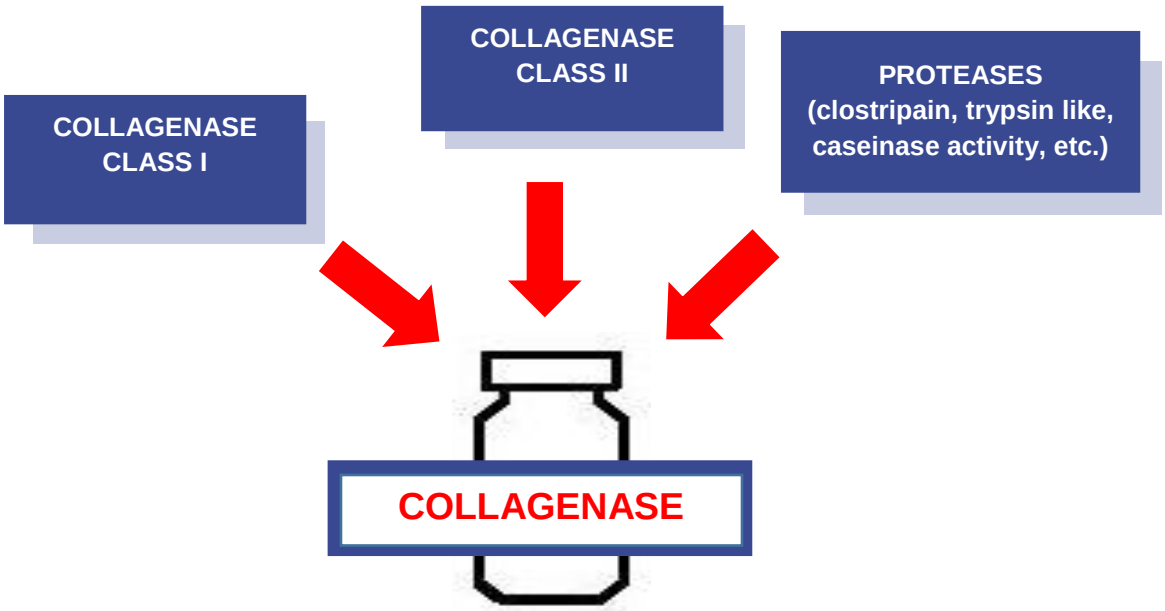


Collagen is the main structural protein of mammalian extra-cellular matrix, and it is present in different isoforms (Type I as in dermis, tendons, bone, Type II as in cartilage, Type III as in skin, etc.). Despite the high structural diversity, all collagen molecules share a triple-stranded helical structure, resistant to proteases, that **can only be degraded by specific collagenases.**

Collagenases are widely used in regenerative medicine and cell therapy as a result of their ability to disaggregate connective tissues and to facilitate the isolation of cells of interest. Among Collagenases the most important ones are **classes I and II** (isoforms I and II according to the nomenclature of Bond and Van Wart 1984 [1]), expressed by *Clostridium histolyticum*, which are preferred to others, since they are proteolytically **active** practically on **all mammalian collagen isoforms**. Class I and Class II collagenases play different synergic roles, in fact, the class I expresses high collagenolytic activity, specifically hydrolyzing native collagen 3D-helix regions, while the class II expresses a modest activity against 3D collagen helix, acting on linear collagen regions at the motif Pro-Y-Gly-Pro [2-3]. The mix of class I and class II collagenases expresses a **synergic activity** that results in efficient collagen digestion [4].

2. 'COLLAGENASE' IS A BLEND

The current technologies to produce collagenases for medical use are based on the culture of *C. hystolyticum* and the subsequent protein purification thereof. The resulting 'Collagenase' are actually blends, containing different percentage ratios of the **two collagenase isoforms (class I and class II), plus a number of proteases** (clostripain, trypsin like, caseinase activity, etc.) [5].



The successful outcome of cell isolation strongly depends on activity, purity, and formulation of 'Collagenase' [4-5]. However, the extraction process of the 'Collagenase' blend from *C. hystolyticum* makes it **difficult to obtain reproducible batches**, while the presence of the proteases can contribute to a **lower stability** due to enzymatic autocatalytic processes. Low batches consistency and low stability can lead to low reproducibility and low standardization of protocols for cell isolation [6].

3. RECOMBINANT COLLAGENASES: STABILITY AND CONSISTENCY

Abiel has synthesized innovative **Recombinant Collagenases** class I (**COL G**) and class II (**COL H**) by a patented technology in *E. Coli* strain. The recombinant production process (animal-free) ensures a high level of **purity, stability and a remarkable lot-to-lot consistency** [7]. The separation of each enzymatic component avoids instability and allows to formulate **customized and standardized** COL G+ COL H blends for each application [8].

For cell isolation, one generic protease is required to digest the non-collagenous part of the ECM. Mixing COL G + COL H + protease, an efficient ECM digestion is obtained [9].

*** either thermolysin, neutral protease/dispase, pronase. For your specific application please refer to** info@abielbiotech.com

References

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For suggestions about your specific protocol or application of COL G and COL H, contact us:

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