Characterization of Successful Collagenase Blend Enzymes for Human Islet Isolation

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A standardization of human islet isolation in order to obtain a sufficient number of good quality islets in a reproducible way is an essential requisite of a successful clinical transplant program. So far a real procedure standardization has not been possible because for one of the crucial steps of isolation, the organ digestion, there is only a no standardized product available, the collagenase, an enzyme with different characteristics from batch to batch, and from vial to vial, because of its instability problems. What is more there are not any precise parameters for a valuation of its efficacy. By different separation techniques, three main proteins each with different prevalence between batches can be identified in Liberase. Two bands correspond to class I (CI) and one to class II (CII) collagenase. CII seemed to be correlated with islet yield and digestion time; additionally, CI directly correlated with purity. Thus CII is associated with the decision as to whether or not to transplant a preparation or not. The purified CII fraction collagenase shows some protein components present in small amounts, whose presence is inversely correlated with the presence of CII collagenase which suggests that they may result from its degradation. The proportion of fragments seems to have a negative role in the isolation process thus suggesting that the quality and the purity of CII collagenase should be further improved. The role of neutral proteases, which represent a small part of the enzyme in a vial, still remains to be defined. This information represents an important step toward a complete characterization of enzymes, with the final aim of identifying key components for a standardized product.