

ABSTRACT

Islets of Langerhans were isolated in high yield from rabbit pancreas using collagenase. Changes in  $\beta$  cell ultrastructure during the process of isolation indicated that active secretion of insulin probably occurred at an early stage.

In isolated islets there was a high percentage of normal cells, but others showed changes that ranged from moderate dilatation of mitochondria to cell disintegration. A crude granule fraction was prepared, and the stability of the  $\beta$  granule at pH 6 and 4°C was established by morphology. The isolated islets exhibited varying degrees of luminosity, which was constant in  $\alpha$  cells, and in the  $\beta$  cells was directly related to granulation and insulin content. In islets with low insulin content, it was possible to distinguish and separate those containing  $\alpha$  cells from others with a nearly pure preparation of  $\beta$  cells.

Biochemical assessment of purity indicated a low insulin to protein ratio for isolated islets. Morphology showed that this was partly due to loss of insulin granules from normal and damaged  $\beta$  cells, while acinar contamination was rare.

Isolated islets showed a marginally significant response to glucose, unlike the highly significant response shown by pancreas slices. The degradation of radioactive insulin by isolated islets was shown to be insignificant. The inclusion of Trasylol ( a proteolytic inhibitor) during incubation was nevertheless found to be beneficial, resulting in a significant reduction of standard errors. No consistent morphological differences in incubated islets were observed that could be related to glucose-mediated release. However, islets isolated in the presence of high glucose showed marked evidence of hyperactivity.

Variable damage in the preparation did not affect the sensitivity of the islet response to hormones. Human growth hormone (25  $\mu$ g/ml) stimulated insulin release, while adrenaline (200  $\mu$ g/ml) inhibited insulin release. Both effects werē independent of glucose concentration. The effect of serotonin (5-hydroxytryptamine) at a concentration of 100  $\mu$ g/ml, was not statistically significant.