THE ROLE OF CALCIUM IN STIMULUS-SECRETION COUPLING OF THE RAT PANCREAS: A STUDY ON THE PERFUSED PREPARATION WITH THE AID OF IONOPHORE A 23187

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1) Experiments were carried out in a perfused rat pancreas pretreated with ionophore A 23187 to investigate the role of the extracellular calcium ion in the "stimulus-secretion coupling".

2) Following pretreatment with A 23187 in a calcium deficient medium, a different concentration of calcium was added to the perfusing medium. The addition of calcium caused increases in both the pancreatic amylase release and the juice flow. The relation between the external calcium concentration and the amylase release or the juice flow resembles that of Michaelis-Menten kinetics.

3) Lowering the extracellular concentration of sodium and the omission of potassium from the extracellular medium inhibited the secretory responses of the pancreas.

4) The addition of dinitrophenol and an anaerobic condition also significantly inhibited these responses, but omission of glucose lower those responses.

5) These results suggest the mode of calcium influx and the role of calcium influx in "stimulus-secretion coupling" of the pancreatic acinar cell.