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*The Journal of the American Diabetes Association*




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# SUBJECT INDEX 1972

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# Opposite Kinetics of L-Leucine and L-Phenylalanine Induced Insulin Release Studied with the Perfused Rat Pancreas

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Little is known about the dynamics of insulin release provoked by amino acids. Therefore isolated pancreases were perfused with saline-dextran buffer, containing leucine or phenylalanine, without recycling. Samples were taken at short intervals and the amount of insulin was measured by an immunoassay. In the absence or presence of substimulatory levels of glucose, 10 and 20 mM leucine caused a biphasic pattern of insulin secretion, comparable to that of 20 mM glucose. When leucine was perfused together with 20 mM glucose no significant additive effect could be observed. However when glucose plus leucine were perfused after an initial stimulatory period with leucine alone, a typical biphasic response was again observed and the additive effect was more pronounced. In contrast, phenylalanine provoked no insulin release in the absence of glucose. In the presence of 2.5 mM glucose, a burst of insulin output occurred after removal of the phenylalanine from the perfusate. When phenylalanine (10 or 20 mM) was added during the second phase of the glucose-induced insulin release, it potentiated the glucose effect after an initial inhibition.

These data suggest the existence of more than one receptor for amino acids for the stimulation of insulin secretion, comparable to, but not necessarily identical with the carbohydrate receptors. Assuming that leucine and phenylalanine use the same transport system (D.L. Oxender, and H. N. Christensen, J. Biol. Chem. *238*: 3686, 1963) our data indicate that the receptor sites for the stimulation of insulin secretion by amino acids may not be transport sites.