



Title	SECRETORY RESPONSE TO SECRETIN IN RAT PERFUSED PANCREAS
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Citation	Japanese Journal of Veterinary Research, 35(2), 159-159
Issue Date	1987-04-30
Doc URL	http://hdl.handle.net/2115/3076
Type	bulletin (article)
File Information	KJ00002374518.pdf



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SECRETORY RESPONSE TO SECRETIN
IN RAT PERFUSED PANCREAS

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1. Influence of extracellular Ca^{2+} on secretin-induced secretory responses (enzyme output and juice flow) was examined in the isolated perfused rat pancreas.
2. Secretin in the range of 100pM to 10nM produced dose-dependent secretory responses.
3. The secretin-induced enzyme output was markedly inhibited when CaCl_2 was removed from the perfusing solution, whereas the fluid secretion induced by higher doses of secretin (1.0 and 10nM) was inhibited insignificantly.
4. Not only the enzyme output but also the fluid secretion induced by 1 μM forskolin were inhibited in Ca^{2+} -deficient environment.
5. Continuous stimulation with 100 μM dbcAMP caused gradual increases in the pancreatic secretory responses. The enzyme output response was abolished but the fluid secretion was slightly inhibited in Ca^{2+} -deficient environment.
6. Continuous stimulation with 1nM secretin induced a gradual increase in the amount of intracellular cyclic AMP, which was significantly decreased in Ca^{2+} -deficient environment.
7. The present results show that pancreatic enzyme output induced by secretin depends on the extracellular Ca^{2+} concentration. In this case the activity of adenylate cyclase, the enzyme of cyclic AMP synthesis, may be inhibited in the Ca^{2+} -deficient environment.

Two possible mechanisms involved in the Ca^{2+} dependent enzyme output were discussed in relation to the two kinds of intracellular second messengers, Ca^{2+} and cyclic AMP.