The Role of Arginine Vasopressin in Diabetes–associated Increase in Glucagon Secretion

Sirintorn Yibchok-anun1, Ehab A. Abu-Basha2, Cheng-Yu Yao3, Wara Panichkriangkrai1, Walter H Hsu3

Abstract

The purpose of this study was to investigate the role of arginine vasopressin (AVP) on glucagon secretion in both normal and diabetic rats. Diabetes was induced by intravenous administration of streptozotocin (50 mg/kg) 14 days before pancreatic perfusion. Diabetic rats were maintained on insulin replacement therapy until ∼48 h before the perfusion experiment. Both glucagon and AVP were determined in the effluent of the perfused pancreas using RIA. Both normal and diabetic rats had similar basal glucagon secretion. AVP (3-30 pM) increased glucagon secretion from both normal and diabetic rats in a concentration-dependent manner. However, diabetic subjects were more sensitive to AVP administration than normal subjects with regard to glucagon secretion. By comparison of the areas under the curves, AVP-induced glucagon secretion in diabetic rats was ∼2-fold that of the normal rats. In addition, immunoreactive AVP was detected in the effluent of the perfused pancreas, and diabetic rats had 70% higher AVP concentrations in the pancreatic effluent than normal rats. We conclude that AVP is secreted from the pancreas and diabetic rats secrete more AVP from the pancreas than normal rats. Consequently, AVP may have a greater impact on glucagon secretion in diabetic subjects than normal ones. AVP might play an important role in the hypersecretion of glucagon in diabetic subjects.

Keywords: Laboratory animals, Rats, Arginine vasopressin, Glucagon; Streptozotocin, Diabetes, Perfused pancreas, Hormones

1Department of Pharmacology, Faculty of Veterinary Science, Chulalongkorn University
2Department of Veterinary Basic Sciences, Faculty of Veterinary Medicine, Jordan University of Science and Technology, Irbid, Jordan
3Department of Biomedical Sciences, College of Veterinary Medicine, Iowa State University, Ames, Iowa, USA

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