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Rapid Communication

Effect of ethanol on pancreatic secretion of lysosomal enzyme stimulated by pancreatic secretagogues in rats

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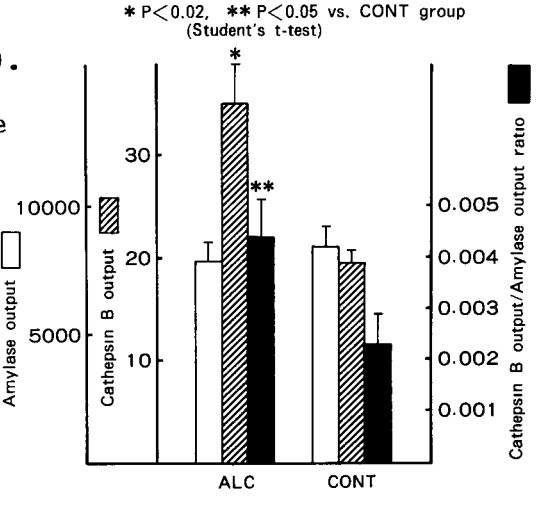
In this study, we evaluated the effect of ethanol on pancreatic secretion of lysosomal enzyme, cathepsin B, stimulated by pancreatic secretagogues, since cathepsin can activate trypsinogen[1].

Fourteen male Wistar rats (about 250 g) were used. After a 16-hour fast, under general anesthesia with intraperitoneal injection of pentobarbital (30 mg/kg), catheterization to the superior vena cava via the external jugular vein as a venous line was performed. All the rats were divided into the following two groups: (a) Alcohol (ALC) group (n=8). Ethanol was infused intravenously at a dose of 0.5 g/kg.hr for 4 hours, and for additional 1 hours, both caerulein (0.2 μg/kg.hr) and secretin (0.2 CU/kg.hr) were infused to stimulate pancreatic juice secretion. Pancreatic juice was collected by catheterization to the pancreaticobiliary duct after making a biliary bypass (PE-10) from the hepatic duct to the duodenum. (b) Control (CONT) group (n=6). In place of ethanol, only heparinized (30 U/ml) saline was infused for 4 hours, and the same procedures as in the ALC group were performed. During the experiments, all the rats were infused with heparinized saline at a rate of 0.58 ml/hr. In the collected pancreatic juice, both amylase[2] and cathepsin B activity[3] were measured. Both enzymes outputs were expressed as U/kg.hr. Cathepsin B/amylase output ratio was also calculated.

There were no significant differences in pancreatic juice volume (ALC:1.13±0.12 ml/kg.hr, CONT:1.18±0.10 ml/kg.hr), nor amylase output (ALC:7976±752 U/kg.hr, CONT:8527±626 U/kg.hr) between the two groups. However, 4-hour infusion of ethanol caused a significant increase in cathepsin B output (35±3 U/kg.hr) compared with the CONT group (19±2 U/kg.hr). Reflecting these data, cathepsin B/amylase ratio in the ALC group was significantly higher (0.0044±0.0008) compared with the CONT group (0.0023±0.0006)[means±SEM](Fig.).



These results suggest the augmented secretion of lysosomal enzymes into pancreatic juice induced by ethanol, and also suggest a role of lysosomal enzymes in the pathogenesis of alcoholic pancreatic ductal injuries, since cathepsin B can activate trypsinogen under appropriate conditions such as low pH levels.

References

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