

## Identification of Pancreatic/Biliary Zn-Binding Ligands and Study of Pancreatic/Biliary Secretion for Zn Homeostasis

In-Sook Kwon and Donald Oberleas  
Food and Nutrition, Texas Tech University, Lubbock, TX 79409, U.S.A.

Pancreatic secretion of zinc into the GI tract is 3 or more times the dietary zinc intake. The purpose of the present research was to study the proteins and zinc distribution in pancreatic/biliary fluid following intraperitoneal  $^{65}\text{Zn}$  injection into a dietary prepared rat. Sprague-Dawley rats (48) were fed a casein-based diet with added phytate containing either high or low Ca for 4 weeks to deplete the body zinc pool. After 21 days of fecal collections, animals were anesthetized, the common bile duct cannulated with small bore tubing and pancreatic/biliary fluid was collected with protein stimulation. Pancreatic/biliary fluid was applied to a Sephadex G-75 column and eluted with 0.01 mol/L Tris buffer, pH 8.1. Subfractions were collected for analysis of protein, total zinc concentration and  $^{65}\text{Zn}$  radioactivity.

Distribution of protein in subfractions showed a peak corresponding to the high molecular weight protein standard (>66kDa) in the pancreatic/biliary fluid. A more remarkable small molecular weight fraction was eluted near the 6.5 kDa protein standard. This demonstrates the presence of molecular weight compounds in pancreatic/biliary fluid associated with zinc which may serve as ligands for the secretion of endogenous zinc into the duodenum. These ligands may dissociate zinc in the duodenum thus making it vulnerable to phytate complexation. It was estimated that the zinc concentration in the pancreatic/biliary fluid for one day (311.40  $\mu\text{g}/\text{day}$ ) was about 2.9 times greater than the zinc amount of dietary zinc consumed for one day (107.89  $\mu\text{g}/\text{day}$ ). Also, both the dietary phytate group and Ca group showed sufficient zinc reabsorption (> 72 %) which was enough to replace zinc which was secreted from pancreas (63%) for the zinc homeostasis.

**Key Words:** pancreatic/biliary fluid, Zn-binding ligands, zinc homeostasis.