V. Metabolism

Effects of Propranolol and Isoproterenol on Myocardial Metabolism in Dogs

N. Kimura, H. Toshima, S. Kodama, T. Mizuguchi, Y. Yokota, S. Nanbu, K. Yamada and E. Minagawa

The Third Department of Internal Medicine, Kurume University
School of Medicine, Kurume

Effects of Propranolol and Isoproterenol on glucose and palmitic acid oxidation in myocardium were studied in dogs by using glucose U-S and palmitic acid I-C.

Ten minutes after the injection of Propranolol or Isoproterenol, 100 Ci 05 glucose U-C or palmitic acid I-C was administrated intravenously. Arterial and coronary sinus blood samples were collected 3, 15, 30 and 60 minutes after the injection of C-substance and CO of blood was absorbed into β-phenecylamine in a vial by the method of Vanslyke-Neil and phenecylamine solution obtained Co was suspended in 10ml of Toluen scintillator. Radioactivity of CO was determined by using liquid scintillation counter. Measurement of coronary blood flow was performed by using Kr method. As results, cumulative % of glucose U-C converted into CO in 60 minutes was 1.0% in control and 0.8% in the case of Propranolol injection, cumulative % of palmitic acid I-C converted into CO in 60 minutes was 4.0 % in Isoproterenol injection. From these observations it seems that Propranolol degucose and fatty acid oxidation in myocardium and its diminution is large in fatty acid metabolism.

Autoradiographic Studies on Mucin Metabolism of Human Gastro-Intestinal Epithelium Using 3H-Glucose and 35SO4

K. Shimamoto, S. Yamashita, Y. Kohli, T. Ashihara, T. Kakiuchi, O. Takeoka and S. Fujita

The Second Department of Pathology, Kyoto Pref. University Medicine, Kyoto

K. Okamoto, Y. Kimura and T. Yoshikawa

Kuramaguchi Hospital

We have already reported on the mucin metabolism of human and rat stomach, studied by means of 35SO4 autoradiography. In the gastric epithelium three types of mucin, i.e. neutral, sulfated and non-sulfated acid mucin are present. To demonstrate the metabolism of all three types of mucin, we injected 3H-glucose and examined the distribution of the label comparing with the results of 35SO4 autoradiography. The double labeling method with 3H-glucose or 3H-thymidine and 35SO4 was employed in many cases. This method enabled to examine the mucin metabolism of generative cells. 3H-glucose autoradiography
300

had been carried out after the labeled sections were treated with saliva.

Incorporation of \(^3\)H-glucose in the rat gastric epithelium is moderate in the surface epithelium, marked in the foveolar cell in both fundic and pyloric regions, weak in the generative cell, the mucous neck cell, the parietal cell and the chief cell and moderate in the pyloric gland in the pyloric region. Incorporation of \(^3\)H-glucose in the surface epithelium, the generative cell, the mucous neck cell and the parietal cell differed from that of \(^35\)SO\(_4\). Synthesis of neutral mucin and/or non-sulfated acid mucin is estimated to be active in these cells.

Incorporation of \(^3\)H-glucose in the human stomach epithelium is little different from that of \(^35\)SO\(_4\) except for the slight incorporation in the surface epithelium and the foveolar cell in the pyloric region, where almost no incorporation of \(^35\)SO\(_4\) was observed.

In the area of the intestinal metaplasia, incorporation of \(^3\)H-glucose and \(^35\)SO\(_4\) after a short time labeling is quite similar, being marked in the intestinal metaplasia especially in the columnar cell which appears to hold no mucin and rather scant in mucin-droplet in the goblet cell. We concluded that this fact showed faster mucin metabolism of the columnar cell than in the goblet cell. To examine more in detail, we injected \(^35\)SO\(_4\), into the rectal and colonic mucosa 1, 8, and 22 hours before the resection, and prepared their autoradiographs. It was observed that, in 22 hours after \(^35\)SO\(_4\) administration labeled mucin was almost discharged in the crypt-lumen but that some still remained in the mucin-droplet in the goblet cell. This fact indicates slow turnover of the mucin in the goblet cell.

\(^14\)C-Lactose Absorption Test for the Diagnosis of Lactase Deficiency

Y. Sasaki, H. Ueda, K. Ide, K. Chiba, M. Iio and H. Kameda

The Second Department of Internal Medicine, University of Tokyo, Tokyo

T. Aoyagi

Department of Internal Medicine, Bokuto Municipal Hospital, Tokyo

At the 7th annual meeting of the Japanese Society of Nuclear Medicine a simple method to measure \(^14\)CO\(_2\) in exhaled air was introduced by the authors. The possibility to use this method for the diagnosis of milk intolerance was suggested at that time. The purpose of this paper is to present further investigation of this method for the diagnosis of milk intolerance.

After oral administration of 5 \(\mu\)Ci of lactose-1\(^14\)C and 50 g of nonradioactive lactose, the \(^14\)CO\(_2\) in exhaled air was collected and measured at \(1\frac{1}{2}\), 1, 2, 3, and 4 hours by the same method as reported last year. Blood sugar level was measured at \(1\frac{1}{2}\), 1, 2, and 3 hours after lactose injection. The jejunal biopsy was performed using Crosby's capsule and jejunal lactose activity was measured by Dahlquist's method.

35 patients including 14 males and 21 females with the age of 15~64 years old were studied. They were classified to three groups according to clinical history and symptoms; group A milk intolerant, group B suspicious but not definitive of milk intolerant and group C milk tolerant.

The curve of \(^14\)CO\(_2\) in breath which followed until 24 hours after lactose ingestion reached their peak either at three or four hours. Therefore the curve until 4 hours after lactose ingestion was compared in each case. The mean of the curves of 6 milk intolerant and 10 milk tolerant showed significant difference between these two groups. The area under the \(^14\)CO\(_2\) curve were calculated in each case and compared among three groups. Group A (8.75\(\pm\)2.34, \(n=6\)) and group C (14.75\(\pm\)2.34, \(n=10\)) showed significant difference and group B showed the distribution extending the range of both group A and C.

Jejunal lactose activities were 0.15~0.67 \(\mu\)g/g wet tissue (\(n=0.30\)) in group A, 0~1.76 (m