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ANALYSIS OF RADIORESPIROMETRIC PATTERN IN THE RAT TREATED WITH ALLOXAN. S.Kojima, Y.Hama, Y.Shiki and A.Kubodera. Faculty of Pharmaceutical Sciences, Teikyo University and Science University of Tokyo. Kanagawa and Tokyo.

Radiorespirometric pattern using [U-C-14]glucose as a substrate in the rat treated with alloxan in connection with the liver glycolytic enzyme activities. The results were as follows:

- (1) The radiorespirometric parameters at an early stage of hyperglycemia altered in connection with those of the liver enzyme activities. Peak time (PT) tended to hasten at 10-20 minutes after the treatment of alloxan, but thereafter delayed up to 24 hours. Both peak height (PH) and yield value (YV) decreased immediately after the treatment to half as much as those of control at 30-40 minutes. At 24 hours after, they recovered to the control levels. On the other hand, the liver glycolytic enzyme, hexokinase (HK) activity in particular was inhibited to about 50% of the control at 30-40 min.
- (2) The increase of blood sugar level at an early stage was probably due to the inactivation of liver HK by alloxan itself.
- (3) The method of radiorespirometry is a useful technique for study of glucose metabolism in liver injury.

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IN-VIVO KINETIC ANALYSIS OF AMINOPYRINE N-DEMETHYLATION IN F-344 RATS. S.Kanai, K.Kitani First Laboratory of Clinical Physiology, Tokyo Metropolitan Institute of Gerontology. Tokyo

Kinetic analysis of aminopyrine N-demethylation was performed in unanesthetized Fisher-344 rats (6 to 8-month-old, male and female) using a  $CO_2$  trapping method after an ip injection of C-14 aminopyrine with varying doses of carrier aminopyrine (2, 5, 10, 20 and 50  $\mu\text{mol}/100\text{g}$ ). Aminopyrine demethylation was assessed from the rate of  $CO_2$  appearance in the expired air which was determined by the increase of C-14 specific activity of the NaOH solution (150ml, 1N) in the trapping bottle. The increase of the C-14 activity in the NaOH solution was linear against time in the first 30 min after the injection. The relation between the dose administered and the velocity of  $CO_2$  production obeyed the Michaelis-Menten kinetics. Kinetic parameters were calculated using the square fitting by a computer. The obtained  $K_m$  values ( $\mu\text{mol}/100\text{g BWT}$ ) were  $33.13 \pm 5.07$ , and  $21.37 \pm 2.70$ , and  $V_{\text{max}}$  values ( $\text{nmol}/\text{min}/\text{g liver}$ ) were  $70.38 \pm 8.81$ ,  $26.58 \pm 2.17$  in male and female rats respectively.

By this method the same animal can be repeatedly studied with the least intervention to the animal and without anesthesia and may be of practical use for the long term follow-up study of various purposes (e.g. enzyme induction) and also for the longitudinal study of aging researches.

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QUANTITATIVE DIAGNOSIS OF RADIOISOTOPE LIVER IMAGE USING TWO-DIMENSIONAL SPATIAL FREQUENCY SPECTRA. E.Takenaka and K.Homma The University of Tokyo and National Mechanical Engineering Laboratory. Tokyo & Tsukuba.

Patterns of 2-D spatial frequency spectra (SFS) of radioisotope liver images as a scale of quantitative diagnosis were measured using optical transformation and digital Fourier transformation and these results were compared with each other. SFS's of liver images were classified into two: the one is SFS of basic form corresponding to the contour and the second is SFS of internal structure modified with internal defect contour defect, multiple defect and ununiform distribution.

1. SFS's of basic form in normal cases were smooth in 1- and 0-order.
2. Dotted or discontinuous higher ordered SFS's were seen in internal defect and contour defect.
3. Defect smaller than the width of the liver influenced higher order SFS's in proportion to its ratio, but containing 0- and 1-order SFS's.
4. Anatomical markings disturbed normal SFS.
5. As to store of radioisotope image information, list mode was superior to histogram mode. The former demanded excellent image processing on display plane.
6. Digital Fourier transformation was inferior to optical one as to details in low frequency region of SFS, but superior to optical one as to reproducibility. It was due to superiority of radial resolution of Opt. T.

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AUTOMATED COMPUTERIZED PATTERN CHARACTERIZATION - USING KOBE-TOIPS (TOTAL IMAGE PROCESSING SYSTEM) -. M.Matsuo, R.Ohnishi, Y.Inoue, K.Suzimura, Y.Ogawa, S.Nishiyama, S.Kimura, K.Ushio, T.Suematsu, K.Nabeshima, C.Kawahara, M.Murata, S.Fujii, Y.Kaneda, T.Uchida and K.Yasui. Kobe University, School of Medicine, Hyogo Prefectural Cancer Center, Hyogo Prefectural Tsukaguchi Hospital, Mitsubishi Hospital, Kobe University, Faculty of Engineering, and Shimane Prefectural Central Hospital. Kobe, Amagasaki and Izumo.

We devised the "KOBETOIPS" (Total Image Processing System), which can process RI, CT, US and X-ray images. In order to develop two-dimensional image data base which is necessary in the software of the total image processing system, the automated computerized pattern characterization of the image is necessary. The algorithm developed by us, which extracts characteristics automatically from 60 cases of liver scintigrams, proved to be effective.