ANALYSIS OF RADIOESPIROMETRIC PATTERN IN
THE RAT TREATED WITH ALLOXAN. S.Kojima,
Y.Hamada, T.Kubodera. Faculty of
Pharmaceutical Sciences, Teikyo University
Science University of Tokyo, Kanagawa
and Tokyo.

Radioespirometric 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 radioespirometric parameters at an
early stage of hyperglycemia altered in con-
nection with those of the liver enzyme ac-
tivities. 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 con-
rol 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 inac-
tivation of liver HK by alloxan itself.
(3) The method of radioespirometry is a
useful technique for study of glucose me-
tabolism in liver injury.

180
IN-VIVO KINETIC ANALYSIS OF AMINOPYRINE
N-DEMETHYLATION IN 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 unanesthe-
tized Fisher-344 rats (6 to 8-month-old,
male and female) using a CO2 trapping
method after an ip injection of C-14 amino-
pyrine with varying doses of carrier amino-
pyrine (2, 5, 10, 20 and 50 μmol/100g).
Aminopyrine demethylation was assessed from
the rate of CO2 appearance in the expired
air which was determined by the increase of
C-14 specific activity of the NaOH solution
(150 ml, 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 rela-
tion between the dose administered and the
velocity of CO2 production obeyed the
Michaelis Menten kinetics. Kinetic para-
eters were calculated using k^2 square
fitting by a computer. The obtained Km
values (μmol/100g BW) were 33.1 ± 5.07,
and 21.37 ± 2.70, and Vmax values (nmol/min/
gliver) were 70.38 ± 8.51, 26.58 ± 2.17 in
male and female rats respectively.

By this method the same animal can be
repeatedly studied with the least inter-
tervention 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.

181
QUANTITATIVE DIAGNOSIS OF RADIOISOTOPE
LIVER IMAGE USING TWO-DIMENSIONAL SPATIAL
FREQUENCY SPECTRA. K.Takemaka and K.Homma
The University of Tokyo and National Mecha-
nical Engineering Laboratory, Tokyo & Tsuku-
bara.

Patterns of 2-D spatial frequency spec-
tra (SFS) of radioisotope liver images as a
scale of quantitative diagnosis were measur-
ed using optical transformation and digital
Fourier transformation and these results were
compared with each other. SFS's of
liver images were classified into two: 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 unif-
form distribution.
1. SFS of basic form in normal cases were
smooth in 1- and 0-order one.
2. Dotted or discontinuous higher ordered
SFS's were seen in internal defect and con-
tour defect.
3. Defect smaller than the width of the
liver influenced higher order SFS's in propor-
tion to its ratio, but containing 0- and
1-order SFS's.
4. Anatomical markings disturbed normal SFS.
5. As to store radioisotope image informa-
tion, list mode was superior to histogram
mode. The former demanded excellent image
processing on display plane.
6. Digital Fourier transformation was inferi-
or optical one as to details in low frequen-
cy region of SFS, but superior to optical
one as to reproducibility. It was due to
superiority of radial resolution of Opt. T.

We devised the "KOBE-TOIPS" (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 ne-
cessary in the software of the total image
processing system, the automated computer-
ized 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.