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INDIRECT ESTIMATION OF PLASMA OXALATE USING C-14 OXALATE J.A.C. Prenen and H.Y. Oei

Determination of renal oxalate (oxal) clearance (clear) and urinary oxal excretion rate permit estimation of plasma oxal indirectly. However, the value obtained will depend on the applied clear method. In this study we compared the results of constant infusion (CI) and single injection (SI) method performed in 6 healthy volunteers. After a priming dose of 2 µCi of C-14 oxal, blood samples were drawn at 7 min intervals during 120 min. Then a second priming dose of 1 µCi followed by a CI containing 2 µCi of C-14 oxal during 6 hr was given. Blood samples were drawn at 30 min intervals and urine collections were made at 60 min intervals. The SI clear was calculated according to one-compartment (comp) model and two-comp model. In the CI-study equilibration time was 2 hr, clear was calculated according to the standard formula. Both the one-comp and the two-comp model consistently overestimated the renal clear of C-14 oxal as compared with the CI-method: 52% (range: 35-67) and 30% (range: 18-44) resp.
In the next study C-14 oxal clear was determined using CI in 3 groups of subjects: 10 healthy volunteers, 12 patients (pts) with normal renal function and 9 pts with impaired renal function. (GFR 7-74 ml/min). Comparison of the C-14 oxal clear with the mean endogeneous creatinine clear determined on the 3 days preceding CI revealed a rather constant oxal-to-creatinine clear ratio of 2:1, which appeared to be independent on the degree of renal failure and urinary oxal excretion.
We conclude that 1. SI overestimates CI oxal clear and 2. Plasma oxal can be estimated from urinary oxal excretion and endogeneous creatinine clear.

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INVESTIGATION OF THE ZINC-STATUS OF PATIENTS WITH RADIO-ZINC C.Cornelisse* and C.J.A.v.d.Hamer**

Determination of zinc in plasma of urine provides seldom a good insight in the zinc-status of a patient because the results are too strongly influenced by other factors. This was confirmed in our study of 33 patients and 3 controls.
In the same study total body retention of i.v. injected 65Zn (0.33 mg Zn containing 5 µCi 65Zn), measured with a simple linear scanner turned out to be a good parameter for distinguishing between normal subjects and those who have become Zn-deficient as result of, e.g., surgery of the digestive tract. However, the long observation time (> 150 d) makes this test unsuitable for clinical use.
Measurements during the first 10 days p.d. of the total body retention of 65Zn, but also of its plasma-clearance and urinary excretion, although providing information about the loss and shift to other compartments of zinc, did not inform about the zinc status. During this same period, measurements of 65Zn retention in the forearm correlated well with the biol.$t_{\frac{1}{2}}$ of the 65Zn as calculated from its total body retention, although the latter required a much longer observation period. Indications are that for measurement of 65Zn in the forearm an observation period of 3 days may suffice, which would make it feasible to replace the 65Zn (phys.$t_{\frac{1}{2}}$=245 d) by 69mZn (phys.$t_{\frac{1}{2}}$ =13.9 h). Measurements of 69mZn in the forearm may be a suitable parameter for the zinc-status.
69mZn has also been shown to be the nuclide of choice for the measurement of the plasma-69mZn after an oral dose of 50 mg Zn (containing 10 µCi 69mZn). Such tests have proved their value for evaluation of the absorption of Zn from the digestive tract and may possibly also be of value for evaluation of the Zn-status when simultaneously the total zinc entering the blood (viz., the specific activity of the Zn) is measured.

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MEASUREMENT OF THE TESTICULAR BLOOD FLOW BY PERCUTANEOUS INJECTED XENON-133 IN THE RAM. J. van Vliet*, H.Y. Oei, A. Hoekstra, A.L. de Ruiter-Bootsma, C.J.G. Wensing.

The chemo- and radiation therapy applied to patients with Hodgkin's disease is rather successful. A relatively long survival time or even a complete cure is possible. One side effect in such patients is the frequent occurrence of total destruction of the germinal epithelium. Protection of the germinal epithelium may be achieved by preventing the cytostatic drugs from reaching the testis. We developed a method to interrupt the testicular blood supply temporarily, reversibly and repeatedly. Blockade of flow has been established by an inflatable occluder placed around the testicular artery at the level of the spermatic cord.
A xenon-133 clearance method was used to investigate the effectiveness of the occluders. 100 to 300 µCi xenon-133 in about 0.02 ml saline was directly injected in the testis. Gamma emission was measured just above the testis and the testicular flow was calculated. A substantial decrease (80 to 90 %) of testicular blood flow was achieved during inflation of the occluders during 30 or 60 minutes. After deflation a remarkable increase in flow was seen.
The disappearance and return of the arterial pulsations after inflation and deflation of the occluders respectively were verified by Doppler flowmetry. It appeared that the changes in testicular blood flow, induced by the occluders, could be estimated satisfactory by the xenon clearance method as well as by Doppler flowmetry.

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Na^+-fluxes in acid-resistant fish, determined with $^{24}Na^+$ as radiotracer G.Flik, Z.Kolar, J.A. v.d.Velden, H.Seegers & S.E.Wendelaar Bonga

Freshwater fish absorb the major part of ions such as Na^+ and Ca^{2+} needed for growth and homeostasis directly from the water via their gills (Flik *et al.*, Am. J. Physiol. 249, R432, 1985). Ions are taken up via so-called ionocytes, mitochondria-rich cells of the branchial epithelium, specialized for the uptake of Na^+ and Ca^{2+} (Flik *et al.*, J. exp. Biol. 119, 335, 1985). Water acidification impairs ion uptake, for high proton levels interfere with Ca^{2+}-binding to membranes, inhibit transport enzymes and increase branchial permeability to water and ions. Some fish, however, show a remarkable ability to adapt to low pH waters (pH 3 - 4.5).
The aim of the present study was to compare the Na balance in two acid-resistant species, viz. the tilapia *Oreochromis mossambicus* and the minnow *Umbra pygmaea*. The latter fish prevails in acidified waters in the Netherlands and Belgium. Both species were well-acclimated and growing at pH 4.5 and 7. The tilapia grows faster at pH 7, the minnow grows faster at pH 4.5. Growth-related Na^+-accumulation was calculated on the basis of weight increase and relationships for body weight (W) and total body Na (Q; Q = $68.3W^{0.909}$ and $42.2W^{1.03}$ µmol Na for the tilapia and the minnow, respectively) and amounted to 4 - 10 nmol /h Na^+ for both species. Sodium influx rates were determined by the use of $^{24}Na^+$ produced at the *I.R.I.*, Delft; influx rates were calculated as the product of the water total Na and the slope of the disappearance curve for tracer from water to fish at t_0. Influx rates are described by F_{in}(pH 7) = $625W^{0.81}$ and F_{in}(pH 4.5) = $348W^{0.89}$ nmol/h Na^+ for the tilapia and F_{in}(pH 7) = $616W^{0.20}$ and F_{in}(pH 4.5) = $256W^{1.23}$ nmol/h Na^+ for the minnow. For a 3.5 g fish the respective values come to 1732 and 1061 nmol/h in tilapia and to 791 and 1195 nmol/h in the minnow, respectively. The ability to enhance Na^+-uptake in acidified water may explain the success of the *Umbra* species under those conditions.

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TC-99m LABELED MONOCLONAL ANTIBODY ANTIFIBRIN FOR IMAGING OF THROMBI IN A RABBIT MODEL J.W. Arndt*, E.K.J. Pauwels*, R.I.J. Feitsma*, W. Nieuwenhuizen**, J.J. Emeis**, and A. Vermond**

Detection of thrombi by radionuclide techniques is a continuing problem. Imaging with radiolabeled fibrinogen or plasmine is non-specific. In this investigation we used a monoclonal antibody directed against human fibrin (AF), developed at the Gaubius Institute. The antifibrin (AF) is radiolabeled with Tc-99m according to a method developed at our institute (patent applied for). The labeling efficiency, established by means of gelfiltration on Sephadex G50 run in 0.9% NaCl, was always above 95%. In Agar- and immunoelectrophorese and in-vitro thrombus experiments labeled and unlabeled AF had similar properties. Tc-99m-AF also adhered in vitro to rabbit-thrombi, allowing the possibility to use the rabbit as the experimental model. Artificial thrombi were induced by implantation in the rabbit abdomen of thrombin-soaked cottons. Two to three hours after the implantation Tc-99m-AF (1.5 mg, 0.7mCi/mg) was injected i.v. Scintigraphy was performed 45 minutes, 4 and 20 hours after injection. Thrombi were visualied with high contast. By way of data-analyses of the scintigrams thrombus-to-soft tissue ratios were calculated. In one experiment ratios of respectively 1.2, 4.9 and 7.7 were found. Thrombi were also induced in the jugular vein without completely obstructing the blood flow. Also, in these cases high contrasted scintigrams were obtained.
The results obtained till now, make it probable that Tc-99m-AF could be useful for non-invasive localizing and visualizing of thrombi in patients.

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