membrane fluidity, and may, therefore, affect this process. Our aim was to determine whether serum cholesterol concentration affects cell membrane cholesterol content and therefore the lag phase before maximum expression of PMN cell NADPH oxidase activity following stimulation of cells with phorbol ester.

Blood was withdrawn after an overnight fast from 20 healthy controls and 12 patients with type IIa hyperlipoproteinaemia. PMN cells were purified by density gradient centrifugation and the lag phase of NADPH oxidase activity measured spectrophotomatically under standardised conditions. Serum and cell cholesterol levels were measured by cholesterol oxidase and HPLC methods.

Mean cell cholesterol content in the hyperlipidaemic patients was 4.19 ±1.29 fmol/cell, which was significantly higher than in the normal subjects (3.10 ±1.07 fmol/cell, $p<0.05$). Cholesterol was present entirely in the unesterified form indicating that it was membrane-associated. There was a strong positive correlation between cell cholesterol content and NADPH oxidase lag phase ($Rs=0.558$, $p<0.005$). These results indicate that cell membrane cholesterol levels are directly related to serum cholesterol concentration and NADPH oxidase lag phase.

PMN super oxidase production and bacteria killing may be impaired in hypercholesterolaemia. A hitherto unrecognised benefit of cholesterol lowering treatment may be improved PMN function.

M106 IRON CHELATION AND RESPIRATORY CHAIN FUNCTION *IN VIVO* IN RENAL ISCHAEMIA-REPERFUSION INJURY

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Mitochondrial function is a major determinant of renal viability following hypothermic storage and transplantation. The objectives of the present study were: (i) to determine the effect of 72 hr hypothermic storage on respiratory chain function immediately after reperfusion; and (ii) to assess the efficacy of iron chelation as a means of improving respiratory chain function. Non-invasive surface fluorescence measurements of mitochondrial NADH were made *in vivo* in unstored (Group 1) and 72 hr stored (Group 2) autografted rabbit kidneys. The 'intracellular' iron chelators CP102 (Group 3) and NMHH (Group 4) and the 'extracellular' chelator desferrioxamine (Group 5) were added to the preservation solution and given *i.v.* to the animal at concentrations previously shown to inhibit susceptibility to *in vitro* lipid peroxidation. Reperfusion was terminated after 4.5 min by a lethal infusion of sodium pentobarbitone, which resulted in the inhibition of complex 1 NADH dehydrogenase. In all groups, reperfusion resulted in the rapid oxidation of a mean 90% of NADH within 2 min ($p<0.005$, $n=6$ in each group). In Group 1 kidneys, inhibition of complex 1 with sodium pentobarbitone resulted in a highly significant ($p<0.005$) rapid increase in NADH fluorescence. In Group 2 kidneys there was no increase in NADH fluorescence following pentobarbitone infusion. Addition of the iron chelators CP102 and NMHH resulted in increases in NADH fluorescence following complex 1 inhibition, but these did not attain significance. However, addition of the 'extacellular' iron chelator desferrioxamine did result in a small but significant ($p<0.05$) rise in NADH fluorescence following complex 1 inhibition. It is concluded that 72 hr hypothermic renal storage resulted in severe damage to the respiratory chain within 5 min of reperfusion. Iron chelation appeared to have a minor stabilizing effect on respiratory chain function, possibly by enhancing cellular membrane integrity. However our data suggests that iron delocalization is unlikely to be a critical determinant of mitochondrial function during reperfusion of ischaemic kidneys.

M107 MAXIMAL OXYGEN UPTAKE IN 80 YEAR OLD MEN

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Criteria for the attainment of maximal oxygen uptake ($\dot{V}O_2$ max) are well established for young but not for elderly subjects. Prediction of maximal heart rate (HRmax) becomes unreliable, conventional criteria for 'levelling-off' of $\dot{V}O_2$ do not allow for the smaller increments in work rate, and neither peak lactate level or the respiratory exchange ratio (RER) has been fully evaluated in very elderly people.

After familiarisation, 10 'medically stable' (*Age Ageing* 1994;23:185-9) men aged 79-82 (mean 80) performed 2 progressive, maximal tests (T1 and T2) on a Cybex cycle ergometer. Data are reported for the 9 judged subjectively to have exercised maximally. Mean maximal values for T1 and T2 were, respectively: heart rate 141 & 139bpm [CV=4.2%], RER 1.05 & 1.03 [CV=2.4%], $\dot{V}O_2$ 1.52 & 1.40l.min^{-1} [CV=15%], $\dot{V}O_2$ per kg body weight 23 & 21.3ml.kg^{-1}.min^{-1}, blood lactate 3.83 & 5.14mmol [CV=38%]. T1 and T2 did not differ significantly in paired comparisons of these variables. The increase in $\dot{V}O_2$ between the last two work rates was expressed as a percentage of the increase predicted, by linear regression, from all work rates except the last. $\dot{V}O_2$ was judged to have levelled off if the ratio was ≤60%. Seven men achieved RER≥1 in T1 and 6 in T2, including the only men to show 'levelling' of $\dot{V}O_2$, 3 in T1 and 5 in T2. The 'levelling' ratio was very variable (CV=65%). Although reproducible HRmax varied widely between subjects (120-170 in T1, 110-180 in T2). Maximal lactate values were much lower than reported for younger men. We conclude that, in 80-year-old men, although maximal tests yield reproducible results for HRmax, RER≥1.0 seems to be the only criterion suited to defining $\dot{V}O_2$max.

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M108 THE USE OF A CRITIKON™ CEREBRAL REDOX RESEARCH MONITOR MODEL 2001 FOR ASSESSING CEREBRAL OXYGENATION AND HAEMODYNAMICS FOLLOWING HEPATIC TRANSPLANTATION

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One major complication post hepatic transplantation (TX) is raised intracranial pressure (ICP). This results in decreased cerebral perfusion pressure and hence reduced blood volume (tHb) and oxygenation (O_2Hb). We considered that if ICP does rise during TX and if this is exacerbated in animals following transplantation of livers which have been preserved for a greater time then near infra-red spectroscopy (NIRS) should be able to detect differences in cerebral oxygenation and haemodynamics between minimally stored and longer preserved grafts.

Male Lewis rats (200-300g) were used in which hepatic isografts were performed using hypertonic citrate solution flush and storage at (1-2°C) 25 min (Group1, n=6) and 24 hr (Group 2, n=4). A new NIRS instrument (CRITIKON™ Model 2001, Johnson & Johnson Medical, Ascot, UK) was used and the probes were placed on either side of the rat head. NIRS monitoring was carried out during the donor and recipient operations. Arterial oxygen saturation was maintained at 100% throughout the procedures. Following a 10 min period of stable baseline the abdomen was opened and the surgical procedures were performed.

During harvesting and recipient operation the cerebral tHb and O_2Hb decreased in both groups and the deoxy-Hb concentration increased. The change in the haemodynamics of the recipient animals in response to portal vein occlusion in preparation of the isograft was not (as expected) as great as the effect of complete hepatectomy. Transplantation of Grp 1 livers resulted in all parameters returning to baseline values which correlates with 100% survival. However isograft transplantation of Grp 2 livers had a minimal effect on the decreased tHb and O_2Hb and remained hypoperfused in agreement with poor viability (12%) following transplantation. This may be the result of hepatic congestion and decreased flow. The results show that there is a difference in cerebral blood volume and oxygenation between the 2