

than in rat skeletal muscle deserves further molecular studies to determine which isoforms of CPT I are expressed in the piglet skeletal muscle.

Communication no. 18

Isoprostanes (8-epi PGF_{2a}), products of lipid peroxidation, as oxidant stress markers. C. Feillet-Coudray, A. Mazur, E. Rock, Y. Rayssiguier (Laboratoire des maladies métaboliques et micronutriments, Inra, Theix, 63122 Saint-Genès-Champagnelle, France)

Free radicals have been implicated in the pathophysiology of a wide variety of diseases including cancer, atherosclerosis, neurodegenerative disorders and even the normal ageing process. Measurement of lipid peroxidation is often employed to evaluate oxidative stress, and more precisely, oxidation products of polyunsaturated fatty acids (TBARS, conjugated diene). These assays, however, suffer from inherent problems related to specificity and sensitivity. Thus, there is a need to provide more reliable markers of oxidative stress *in vivo*. Recently, isoprostanes have been proposed and seem to be particularly valuable markers. Isoprostanes are produced by the free-radical peroxidation of arachidonic acid. Morrow et al. (Morrow et al., Proc. Natl. Acad. Sci. USA 87 (1990) 9383–9387) were the first to quantify free isoprostanes in plasma and urine by GC/MS, and to demonstrate the increased levels of lipid peroxidation in animal models. Measurement of isoprostanes allowed the detection of oxidative stress in animal models and provided evidence for a role of oxidative stress in human disease. In animals, administration of CCl₄ to normal rat and diquat to selenium-deficient rats, combined with vitamin E/selenium and iron overload caused increased levels of isoprostanes. In humans, increased levels of isoprostanes were observed in relation to age, chronic cigarette smoking, diabetes and hypercholesterolemia; administration of vita-

min E decreased these levels (Morrow et al., Biochim. Biophys. Acta 1345 (1997) 121–135).

We carried out a large number of nutritional and metabolic disorder studies in animal models, using GC/MS methods (which are difficult and expensive) and recently developed immunoassay methods (which are less time consuming and less expensive). Deficiencies in antioxidant micronutriments (zinc, copper), ageing, alcohol intake and diabetes (STZ) were investigated in rats. Increased urinary levels of isoprostanes were observed in Cu-deficient animals on a prooxidant diet (fructose). Membrane alterations in Cu-deficiency which are related to haemolytic anaemia, may explain this observation. No modification in the levels of isoprostane was observed in other studies. In humans, trials are under way to assess isoprostane levels in degenerative disorders associated with ageing.

The discovery of isoprostanes has opened up new areas of investigation regarding the occurrence of free radical damage in human physiopathology and may provide a valuable approach to evaluate the efficiency of antioxidant micronutriments.

SESSION 3:

TISSUE GROWTH

Communication no. 19

Apoptosis in myogenic cells: effect of oxidative stress and flavonoid antioxidants. A. Orzechowski^a, J. Skierski^b, W. Zimowska^b, B. Balasinska^b, T. Motyl^b, B. Lukomska^c (^a Department of Animal Physiology, Warsaw Agricultural University, Nowoursynowska 166, 02-785 Warsaw, Poland; ^b Flow Cytometry Laboratory, Drug Institute, ^c Surgery Research and Transplantation Department, Medical Research Center Institute, Warsaw, Poland)

Muscle differentiation is initiated by a Rb (retinoblastoma) gene product (Okuyama