saliva and urine samples were collected before and 4, 5, 6, 7 and 8 h after labeling 41 healthy volunteers (aged 67.5 ± 5.1 years, mean ± SD; 20 women, 21 men). The dose of 2% ^{18}O water was designed to increase the enrichment of TBW by 38 ppm above natural abundance. Eight of the volunteers also had a determination of TBW using 10% ^{18}O water (enrichment of TBW increased by 307 ppm). Isotopic enrichments were measured by gas-chromatography isotope ratio mass spectrometry.

TBW (in % of body weight) did not differ whether 2 or 10% water was used (mean difference 0.88 ± 1.84%, $P = 0.22$). An isotopic plateau was reached at hour 4 and lasted till the hour 8. The plateau value did not differ significantly between the three types of samples except for urine samples at hour 4; plasma 2 037.7 ± 4.3, urine 2 037.7 ± 4.0, urine 2 036.4 ± 5.1 ppm, P vs U and S vs U: $P < 0.01$. TBW calculated from the enrichment at hour 5 (34.94 ± 6.8 kg) did not differ from that calculated from the plateau value (34.98 ± 6.80 kg, P = NS).

In this group of elderly patients, TBW was 49.1 ± 5.7% and fat mass was 32.9 ± 7.8% of body weight. Fat mass differed with gender (men 27.5 ± 5.7, women 38.5 ± 5.2%, $P < 0.0001$).

In conclusion, TBW and body composition can be accurately and precisely measured, at a low cost, with low enriched ^{18}O labeled water. Collection of two samples of either urine or saliva made the method truly noninvasive. The present study confirmed body composition changes with age.

Influence of nutritional status on diet-induced thermogenesis in cold acclimated rats. R Bertin, F De Marco, R Portet *(Ephe, 105, boulevard Raspail, 75006 Paris, France)*

The experiments were performed on 7-week-old Sprague-Dawley rats which were acclimated for 3 weeks either at 28 °C (thermoneutrality) or 5 °C. The animals were fed ad libitum (N group) or fasted for 18 h (J group) or fasted then refed for one and a half hours (RN group). They were given water and a commercial diet (UAR A03), and had light from 0700 to 1900 hours.

The indirect estimation of energy metabolism (EM) was performed on the three groups of rats, by continuous measurements of the O_2 consumption and CO_2 release at 25 °C by using an open circuit respirometer at the end of the feeding, fasting or refeeding periods.

The animal's capacity for nonshivering thermogenesis (NST) was estimated by the increase in oxygen consumption after ip injection of norepinephrine (NA) (400 µg/kg) and the duration of NA action (time between the onset of the increase and the return to the basal level).

Moreover, the levels and turnover rates of NA and the levels of serotonine (5HT) were measured in the interscapular brown adipose tissue (IBAT).

The resting metabolism was significantly higher in the 5 °C rats (N, J and RN groups) than in the three corresponding 28 °C groups. In these latter rats, no effect of fasting was observed, but, in the RN group, there was a significant increase ($P < 0.05$) in EM. In the 5 °C fasted group, compared to the fed group, there was a substantial decrease (20%) in EM. In refed rats a large diet-induced thermogenesis (DIT) was observed compared to fasted animals (30%: $P < 0.001$). The NST ability was found to be greater in the 5 °C than in the 28 °C rats. In this latter group, the maximal response was decreased by fasting and it was not restored in RN rats as it occurred for the duration of NA action. In the 5 °C group, the maximal response was not decreased by fasting. This contrasted with the global effect which was restored in RN animals.

The NA level in the IBAT of the 28 °C rats was the same in the three groups (N, J, RN); the NA turnover rate was very slow and could not be measured. In the 5 °C rats the NA level was enhanced in the J and RN groups; however, the NA turnover rate was enhanced only in the RN group.

In the interscapular brown adipose tissue, the 5HT level was twice as high in the 5 °C rats than in the 28 °C rats. It was significantly enhanced in only the 5 °C J and RN rats.

It was concluded that, under the present experimental conditions, DIT was low in thermoneutral acclimated rats. Cold acclimation induced a large increase in DIT. In the brown fat it seemed that NA and 5HT may be involved in this phenomenon.

Comparative study of daily energy expenditure measured by physical activity questionnaire (QAPSE) and physical fitness (VO_2max) in the elderly. M Bonnefoy [1], T Kostka [2], SE Berthouze [3], JR Lacour [4] *([1] Service de médecine gériatrique, Centre hospitalier Lyon-Sud, 69495 Pierre-Bénite; [2] Departement of Preventive Medicine, Medical University, Lodz, Poland; [3] Département de rééducation et réadaptation fonctionnelles, GIP Exercice, faculté de médecine, université Jean-Monnet, Saint-Étienne; [4] Laboratoire de physiologie, GIP Exercice, faculté de médecine de Lyon-Sud, Lyon, France)*

The purpose of this study was to validate a physical activity questionnaire QAPSE (Questionnaire d'Activité Physique Saint-Etienne) in a homogeneous population of elderly subjects and to estimate its potential application in routine physical activity (PA) assessment in that age group. Sixty-five (31 men and 34 women) community dwelling, healthy people aged 65–84 years participated in the validation substudy in comparison with the VO_2max measured by a maximal exercise test and anthropometric data. The reproducibility of the questionnaire was assessed by a test-retest design. The questionnaire was completed twice by 44 subjects after an interval of at least 6 weeks. Maximal oxygen consumption (VO_2max) correlated positively with mean habitual daily energy expenditure (MHDEE) ($r = 0.56$; $P < 0.0001$), > 3METs (metabolic equivalent) DEE activity ($r = 0.371$; $P = 0.002$), leisure activity ($r = 0.368$; $p = 0.003$), sports activity ($r = 0.461$; $P < 0.0001$), basic daily activity ($r = 0.325$; $P = 0.008$) and moving DEE activity ($r = 0.273$; $P = 0.028$). MHDEE was positively correlated with body weight ($r = 0.464$) and with fat free mass ($r = 0.639$) and negatively correlated with percentage of body fat ($r = -0.501$). MHDEE levels found in our study (9 904 ± 1 083 kJ for men and 7 950 ± 732 kJ for women) were in agreement with the values of total energy expenditure obtained in elderly people using other questionnaires as well as those measured by other methods: energy intake or doubly labelled water technique. Paired *t*-test based mean differences between the two administrations of the questionnaire completed at different times did not reach statistical significance for any of the studied QAPSE activity indices. Test-retest correlation coefficients ranged from 0.648 for the moving index to 0.967 for MHDEE with the correlation coefficient P values being < 0.0001 for all the QAPSE activity indices. Our data showed a better correlation between the physical fitness and physical activity of the subjects than any of previous studies conducted in elderly people. The strong correlations obtained were a result, in our opinion, of the very precise measurement of all the daily physical activities of older persons. The reliability of the data appeared to be at least comparable with other questionnaires for elderly people concerning high intensity activities and are clearly better for low intensity activities.