phy-isotopic-ratio-mass-spectrometry (GC-IRMS). Glucose turnover rate ($R_{a,glc}$) was calculated from d_2-glc enrichment in plasma at steady state. Results are means ± SD, significance of observed differences using paired-*t*-test. Extending the fasting state form 13 h to 37 h: 1) $R_{a,glc}$ decreased from 10.9 ± 1.1 to 8.1 ± 0.6 $\mu mol.kg^{-1}.min^{-1}$, $P < 0.01$, 2) glutamine contribution to neo-formed-glucose carbon skeleton increased from 8 ± 3 to 16 ± 7%, $P = 0.02$, and 3) non specific CO_2 transfer to glucose remained unchanged (4 ± 1 vs 3 ± 2% of total carbon flux to glucose, NS).

Conclusions: a) carbon transfer from glutamine to glucose mainly occurs through the Krebs cycle, and b) glutamine contribution to gluconeogenesis increases with the duration of fasting. This study emphasizes the role of glutamine as a major gluconeogenic precursor in vivo.

Dietary protein quality influences post-prandial protein utilization. Y Boirie [1], M Dangin [1], P Gachon [1], JL Maubois [2], B Beaufrère [1] *([1] Laboratoire de nutrition humaine, CRNH, 63000 Clermont-Ferrand; [2] Laboratoire de technologie laitière, Inra, 35000 Rennes, France).*

During feeding, protein intake modulates post-prandial protein gain, but protein structure may also influence kinetics of protein metabolism. The aim of the study was to evaluate protein catabolism and leucine oxidation after ingestion of two proteins with high biological value, but with different digestion rate. Leucine metabolism was investigated in 12 healthy volunteers in non steady state conditions after a single protein meal consisting in two milk protein fractions, whey protein (WP) or casein (CAS). Using a combination of tracers (13C leucine – either in an intrinsically labelled protein and orally administered, or free and intravenously – and 2H3 leucine – free orally or IV administered – respectively), kinetic modifications over 420 min following meal ingestion were calculated from plasma leucine concentrations and enrichments and from 13CO2 enrichments in breath. Leucine rate of appearance from CAS is slower but more prolonged than from WP (exogenous leucine flux: 0.82 ± 0.03 vs 0.29 ± 0.08 $\mu mol.kg^{-1}$, moy ± SEM, CAS vs WP at 240 min, $P < 0.001$). Endogenous leucine flux (an index of protein catabolism) is progressively inhibited with a constant inhibition between 120 and 360 min with CAS, whereas WP do not change proteolysis (–30.2 vs –7.1% from baseline, CAS vs WP at 240 min, $P < 0.01$). Cumulative ingested leucine oxidation is identical with the two proteins (≈ 1/3 of ingested leucine is oxidized), but total leucine oxidation is lower with CAS. Thus, net leucine balance over 7 h (intake minus total oxidation) is neutral, with WP and positive with CAS (+ 135 ± 38 vs –11 ± 15 $\mu mol.kg^{-1}$, CAS vs WP, $P < 0.01$).

In conclusion, casein administered as a single protein load, compared with whey protein, results in a prolonged rate of amino acids appearance, a net inhibition of proteolysis, a lower total leucine oxidation and is responsible for a better protein gain.

Growth and muscle protein turn-over: effect of genotype and amino acids. S Tesseraud, A Besnard, R Peresson, J Michel, E Le Bihan-Duval, AM Chagneau *(Inra, station de recherches avicoles, 37380 Nouzilly, France).*

Broiler carcass quality can be improved by the usual selection techniques. A quality line was thus selected which yielded birds with low fatness and high breast meat yield [Richard et al (1994), *Inra Prod Anim* 7, 253-261]. We analysed the effects of this selection on amino acid requirements and muscle protein turnover in 3-week-old chicks.