Table I. (JF Gabbarou, PA Geraert)

	R+				R−			
	Control mean	*DFF mean*	*DFF + PPL mean*	*RSD*	*Control mean*	*DFF mean*	*DFF + PPL mean*	*RSD*
Food intake (g/day)	125[a]	58[c]	54[c]	8.8	75b	47[c]	38[c]	5.9
Heat production [a]	409[a]	399[a]	361[b]	9.7	286[c]	303[c]	294[c]	7.5
Respiratory quotient	0.94[a]	0.82[b]	0.80[b]	0.01	0.93[a]	0.84[b]	0.81[b]	0.01
Diet -induced thermogenesis (% EMi) [a]	23.6[a]	44.4[b]	37.3[b]	5.7	10.3[c]	23.2[a]	24.8[a]	8.9

[a] Heat production (HP) in $kJ/kg^{0.75}$.d. Diet-induced thermogenesis = (fed HP – fasted HP) / metabolisable energy intake. Mean values with different letters were significantly different ($p < 0.05$). RSD: residual standard deviation.

β-adrenergic and serotoninergic control of diet-induced thermogenesis in birds. JF Gabarrou, PA Geraert (*INRA, Station de Recherches Avicoles, 37380 Nouzilly, France*)

Two experimental lines have been divergently selected for high (R+) or low (R–) residual feed intake [Bordas *et al* (1992) *Br Poult Sci* 33, 741-754]. Observed feed intake differed by 40% in males for the same bodyweight, and by 20% in females for the same bodyweight and the same egg-mass produced.

Energy balance measurements showed that basal metabolic rate did not differ between lines while diet-induced thermogenesis (DIT) or heat increment appeared significantly increased in R+ males compared to R– males: +84% if expressed as the difference between fed and fasted heat production [Geraert *et al* (1992) *Proc Nutr Soc* 51, 86A]. The energy balance of the females appeared similar, divergence in heat increment reached +133%.

Recent works in mammals suggest that part of the DIT is under sympathetic or β-adrenergic control. In the R+ and R– experimental lines, oral administration of DL-propranolol, a non-specific β-blocking agent (PPL, 5 mg/kg) reduced heat production in R+ birds but not in R–. Central control of DIT has also been investigated using D-fenfluramine, a 5-HT agonist (DFF, 10 mg/kg), well known for its thermogenic and thermolytic properties (table I). Combined stimulation of thermogenesis by fenfluramine and β-adrenergic blocking effect of propranolol (DFF+PPL) was also studied in females of both lines (table I).

The anorectic effect of DFF seems more important in the R+ line. Indeed, their feed intake was reduced to the level of the R– genotype. While the thermogenic effect of DFF did not differ between lines, propranolol significantly reduced heat production only in R+ hens (–9.5%) without any effect in the R–birds. The divergence in diet-induced thermogenesis between genotypes is partly under sympathetic control, while serotonin (5-HT) is more involved in the regulation of feed intake than thermogenic abilities.

V. Genetic–nutrition interactions

Biosynthesis of arachidonic acid (20:4n –6) in the liver of obese Zucker rats. JP Blond, JM Cao, J Bezard (*Nutrition Cellulaire et Métabolique, Université de Bourgogne, BP 138, 21004 Dijon Cedex, France*)

The genetically obese Zucker rat is characterized by a lower level of arachidonic acid (20:4n – 6), in hepatic lipids (expressed as a percentage of total fatty acids), than in the lean animal, in agreement with a partial inhibition of Δ6 and mainly Δ5 microsomal desaturation [Blond *et al* (1989) *Lipids* 24, 389-395; Guesnet *et al* (1990) *Lipids* 25, 517-522]. The aim of this study was to investigate whether treatment with a hypocholesterolemic drug (simvastatin, which stimulates fatty-acid