Table I. Tissue protein content, absolute protein synthesis (ASR) and ribomosal capacity (Cs) of male chickens exposed to 22 or 32 °C from 4 to 6 weeks of age.

		22 °C	32 °C
Muscle	protein content (g)	14.97 ± 0.62	11.42 ± 0.25***
	ASR (mg/d)	1689 ± 73	845 ± 44 ***
	Cs (mg/g)	9.5 ± 0.2	6.8 ± 0.2***
Liver	protein content (g)	6.47 ± 0.48	4.77 ± 0.24**
	ASR (mg/d)	5308 ± 324	3724 ± 366**
	Cs (mg/g)	55.5 ± 1.9	48.6 ± 2.2*

Data represent the means ± SE for six chickens per group.
Statistical significance: * < 0.05, ** < 0.01, *** < 0.001 compared with 22 °C.

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Protein metabolism in heat-exposed chickens. S. Temim, F. Alleman, A.M. Chagneau, R. Peresson, J.P. Caffin, J. Michel, S. Tesseraud (Station de recherches avicoles, Inra, 37380 Nouzilly, France)

Heat-exposed chickens exhibit a decreased feed intake, a lower growth rate and also a depressed protein gain, which suggests an alteration in protein metabolism (Geraert et al., Br. J. Nutr. 75 (1996) 195–204).

The aim of this study was to examine the effect of chronic heat exposure (32 °C versus 22 °C) on protein metabolism in 4- to 6-week-old male broiler chickens. The protein synthesis rate was measured in vivo (by flooding dose of [^{3}H]-Phe) in the *Pectoralis major* muscle and in the liver of six birds from each treatment. It was expressed as ASR (amount protein synthesised/day). The ribosomal capacity (Cs) was estimated for each tissue using the ratio of RNA to protein. The activities of two key liver enzymes involved in amino acid catabolism, aspartate amino transferase (ASAT) and glutamate dehydrogenase (GDH), were also determined. Nitrogen excretion was measured in representative animals from both treatment groups ($n = 8$).

Chronic heat exposure significantly reduced the protein content, Cs and ASR irrespective of the tissue studied (*table I*). These variations were more pronounced in the *Pectoralis major* muscle than in the liver, suggesting that protein turnover responsiveness to heat exposure is tissue dependent. The ASAT and GDH activities, expressed in mmol/min per g, tended to be higher in heat-exposed animals compared to those maintained at thermoneutrality (+15 %, $P = 0.15$; +22 %, $P = 0.22$, respectively). This tendency is in agreement with the slightly increased nitrogen excretion (expressed in g/kg BW) recorded for birds maintained at the higher temperature (+15 %, $P = 0.25$).

In conclusion, chronic heat exposure in broiler chickens resulted in a significant depression of tissue protein synthesis rates, especially in skeletal muscle. This was mainly related to a lower ribosomal capacity. The underlying mechanisms responsible for these alterations in protein metabolism await clarification.