

GHRELIN, LEPTIN AND THE NESTING ACTIVITY OF THE HAWKSBILL
SEA TURTLE (*Eretmochelys imbricata* Linnaeus, 1766)

Daphne Wrobel Goldberg^{1,2}, Santiago Alonso Tobar Leitão¹, Armando José Barsante³,
Jayme da Cunha Bastos¹, Vera Lúcia Freire da Cunha Bastos¹

¹ Departamento de Bioquímica, Universidade do Estado do Rio de Janeiro, Av. 28 de setembro, 87 Fds, 4º Andar, Vila Isabel, Rio de Janeiro, RJ, CEP: 20551-030, Brazil.

² Fundação Pro-Tamar, Caixa Postal 5098, Florianópolis, SC, 88040-970, Florianópolis, Santa Catarina, Brazil.

³ Fundação Pro-Tamar, Caixa Postal 50, Fernando de Noronha, PE, 53990-000 Brazil.

Sea turtles make long-distance reproductive migrations, and some species are thought not to feed after arriving at their nesting grounds. Therefore, while on their foraging waters, these species must store energy and nutrients required for reproductive output. Females may become underactive between oviposition episodes to save their energy reserves for nesting purposes.

Among explanations for this hypophagia, low food availability in waters near the nesting beaches has been pointed out, but data on hormones capable of regulating food intake by these turtles have yet to be published.

Leptin (appetite-suppressing protein) and ghrelin (hunger-stimulating peptide) affect body weight by influencing energy intake in all vertebrates. Expression and secretion of ghrelin are increased by fasting and reduced by feeding. Conversely, leptin is an adipocyte-derived hormone related to body adiposity, which secretion is reduced by fasting.

To correlate these hormones with nutritional parameters that indicate food consumption or fat metabolism, consecutive blood samples were withdrawn repeatedly from each of 21 specimens of *E. imbricata* during the 2010/2011 reproductive season. These turtles were nesting along the coast of Parnamirim municipal district, Rio Grande do Norte State, Brazil. On first contact, the females exhibited an average post-oviposition weight of 83.95 kg (\pm 12.07; n=14). At the end of the nesting season, this average dropped to 77.18 kg (\pm 9.85; n=14). They had an average weight loss of 7.73% (\pm 5.2).

Triacylglycerols, urea and total protein concentrations changed with increasing number of nesting episodes, indicating lipolytic and proteolytic responses to fasting.

During fasting, adipose tissue triglycerides are broken down by a hormone sensitive lipase to glycerol and free fatty acids. Fatty acids are used as an energy source, especially in muscle tissue, reducing the demand for organic glucose. Small amounts of glycerol from fat are then converted into glucose through gluconeogenesis. Moreover, during fasting, catabolism of muscle proteins to aminoacids produces the major source of carbon for maintenance of blood glucose levels. A consistent rise in blood urea nitrogen (BUN) throughout the nesting period also indicated muscle protein utilization.

Leptin in serum decreased significantly as the number of nesting events per individual increased. Initially the average serum levels were 2005.95 ng/ml (\pm 708.34; n = 12), decreasing to 348.7 ng/ml (\pm 198.6; n = 8). On the other hand, ghrelin serum levels were markedly lower at the beginning of the nesting period (31.56 pg/ml \pm 14.25; n = 12) than at the end of the nesting season (714.78 pg/ml \pm 308.92; n = 8).

Our findings indicate that the hormones leptin and ghrelin, both capable of affecting appetite and food intake, could be involved with the hypophagia observed in nesting sea turtles.