

Assessment of adrenocortical activity and behavior of the collared anteater (*Tamandua tetradactyla*) in response to food-based environmental enrichment

1. Gabina V. Eguizábal¹,
2. Rupert Palme²,
3. Daniel Villarreal³,
4. Carla Dal Borgo³,
5. Julio A. Di Rienzo⁴,
6. Juan M. Busso^{5,*}

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Author Information

1 Facultad de Ciencias Exactas, Físicas y Naturales (FCEFyN), Universidad Nacional de Córdoba (UNC), Argentina

2 Department of Biomedical Sciences/Biochemistry, University of Veterinary Medicine, Vienna, Austria

3 Área Conservación e Investigación, Jardín Zoológico Córdoba, Córdoba, Argentina

4 Cátedra de Estadística y Biometría, Facultad de Ciencias Agropecuarias, UNC, Córdoba, Argentina

5 Instituto de Investigaciones Biológicas y Tecnológicas, FCEFyN-UNC and Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET), Córdoba, Argentina

*Correspondence to: Juan M. Busso, Instituto de Investigaciones Biológicas y Tecnológicas, CONICET and FCEFyN-UNC, Av. Velez Sarsfield, 1611, X5016GCA Córdoba, Argentina. E-mail: jmbusso@conicet.gov.ar (<mailto:jmbusso@conicet.gov.ar>)

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non-invasive monitoring of glucocorticoid metabolites; activity pattern; diet; xenarthra; stress; welfare

One of the current standard approaches to the study of animal welfare is measuring hypothalamic–pituitary–adrenal activity, frequently in association with behavioral assessment. We studied the effects of food-based environmental enrichment on adrenocortical activity and behavior in zoo-housed collared anteaters (*Tamandua tetradactyla*; $n = 5$). We successfully validated measurements of fecal cortisol metabolites (FCMs) using an 11-oxoetiocholanolone enzyme immunoassay by stimulating (ACTH injection) and suppressing (dexamethasone administration) adrenocortical activity. Three months later, we subjected animals to an ABA-type experiment (three 6-week periods): pre-enrichment (routine diet: A), enrichment (modified diet: B), and post-enrichment (routine diet: A) periods. We assessed adrenocortical

activity by collecting individual feces three times a week (total number of samples: 228), and evaluated behavior by performing 3 days of behavioral observations per period (with a total of 3,600 behavioral data points for the individuals studied). Statistical analysis revealed changes in FCM concentrations ($\mu\text{g/g}$) over the periods (3.04 ± 0.68 , 2.98 ± 0.66 , and 4.04 ± 0.90 , respectively). Additionally, it showed that the number of FCM peaks was highly reduced during enrichment; meanwhile active natural behaviors were significantly increased. We consider that these changes in response to food-based environmental enrichment improved the welfare of individual zoo-housed collared anteaters. This research might contribute to in situ and ex situ studies on the physiology and behavior of this endemic South American species. Zoo Biol. XX:XX–XX, 2013. © 2013 Wiley Periodicals, Inc.

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