

A direct calorimetric system for the continuous recording of heat balance of freely moving small animals.

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1988 Fiscal Year Final Research Report Summary

A direct calorimetric system for the continuous recording of heat balance of freely moving small animals.

Research Project

Project/Area Number

61870009

Research Category

Grant-in-Aid for Developmental Scientific Research

Allocation Type

Single-year Grants

Research Field

環境生理学(含体力医学・栄養生理学)

Research Institution

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Keywords

direct calorimeter / automatic feeder / restricted feeding / heat loss / exercise efficiency / 体温調節

Research Abstract

A system has been designed which provides for simultaneous measurements of heat loss and heat production of freely moving rodents under restricted feeding schedules. The system includes specially designed calorimeter, an air supplier and flow regulators, air remperature controllers, a thermobath for heat sink temperature regulation, humidity sensing devices or a platometer, O₂ and CO₂ analyzers and a data logger and a personal computer. The over-all response time and the sensitivity of the calorimeter are less than 5 min and 0.499 W/mV at a calorimeter remperature of 25° c. Heat production was estimated from continuous measurements of O₂ consumption and CO₂ production, and changes in heat balnce were computed with the personal

computer. Using this system, following results were obtained. 1) Effects of peptides injected into the cerebroventricle are in different directions in heat loss response with different peptide-groups. 2) A clear daily difference in temperature regulatory responses to body warming exists when rats are physically restrained, but not when they were allowed to move freely. 3) The effects of intermittent and continuous heat exposures are different according to the mode of heat exposure to obtain heat acclimation in rats. 4) Food restricted rats (2 hours feeding only in a day) enhance wheel running activity several hours before and after the feeding time. The relationship between wheel running and average heat production was not different between pre- and post feeding periods and control ad-lib feeding period. 5) Fasting suppresses heat loss response to intravenous injections of endotoxin and endogenous pyrogens but not to intracerebroventricular injections. Several other experiments were also conducted.

Research Products (11 results)

All	Other
All	Publications (11 results)

[Publications] 永坂鉄夫: High Altitude Medical Scieinc Shinshu Univ.392-396 (1988)	▼
[Publications] 永坂鉄夫: Japanese Journal of Biometerology. 26. (1989)	▼
[Publications] 紫藤治: Journal of Applied Physiology.	▼
[Publications] 紫藤治: Journal of Applied Physiology.	▼
[Publications] 紫藤治: Journal of Applied Physiology.	▼
[Publications] 紫藤治: Journal of Applied Physiology.	▼
[Publications] Tetsuo,Nagasaka: "How fasting affects restraint-induced thermogenesis in rats?" High Altitude Medical Science Shinshu Univ.392-396 (1988)	▼
[Publications] Tetsuo,Nagasaka: "Locomotor activity and heat production of rats on restricted two-hour feeding regimes." Japanese Journal of Biometeorology. 26. (1989)	▼
[Publications] Osamu,Shido: "Blunted febrile response to intravenous endotoxin in starved rats." Journal of Applied Physiology.	▼
[Publications] Osamu,Shido: "Changes in body temperature of rats acclimated to heat with different acclimation schedule." Journal of Applied Physiology.	▼
[Publications] Osamu,Shido: "Thermoregulatory responses to heat loaded by internal or indirect external warming in rats acclimated to continuous heat exposure." Journal of Applied Physiology.	▼

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