AVOIDANCE OF EXERCISE IS A MORE-SENSITIVE RESPONSE TO LPS ADMINISTRATION THAN ARE FEVER AND ANOREXIA IN RATS

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Background- There have been suggestions that sickness behaviour is a more-reliable indicator of pyrogenic illness than is fever, but formal tests of the sensitivity to pyrogen administration of sickness behaviour and fever in the same animals are lacking. We measured the sensitivity of exercise, food intake and fever to lipopolysaccharide (LPS) administration in the same rats. Procedure – We gave male Sprague-Dawley rats (initial mass 100-200g) three doses of LPS (10, 50, 250 µg kg⁻¹), or saline, subcutaneously, in random order. The rats were unrestrained, and at ambient temperature 21 ± 2°C. We measured wheel running activity, food intake and abdominal temperature (continuously, by radiotelemetry). A second group of rats had access to the exercise wheels for six weeks before LPS was injected. Results – Administration of LPS induced a dose-dependent increase in abdominal temperature, and decrease in running, food intake and growth. Regression analysis of the responses to LPS administration of previously-sedentary rats revealed that decreased running was the most-sensitive of the responses, with a slope of -41% log⁻¹(µg kg⁻¹), and a theoretical threshold of 1 µg kg⁻¹, compared to -30% log⁻¹(µg kg⁻¹) and 7 µg kg⁻¹ for food intake, -2.2% log⁻¹(µg kg⁻¹) and 18 µg kg⁻¹ for body mass, and a threshold of 4µg kg⁻¹ for increase in abdominal temperature. Neither the fever nor the decrease in food intake and growth were affected significantly by six weeks of previous access to the running wheels. Conclusions – Avoidance of exercise was a more-sensitive indicator of the effects of LPS administration than were anorexia and stunting, and fever indeed may not be the most-appropriate index of pyrogenic illness.