

METABOLIC CONSEQUENCES OF THE EARLY ONSET OF OBESITY IN COMMON MARMOSET MONKEYS.

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Abstract

We examined the patterns of fat mass gain from birth to 12 months in common marmosets (*Callithrix jacchus*), and tested the hypotheses that juvenile marmosets with excess adipose tissue will display higher fasting glucose, decreased insulin sensitivity, and decreased ability to clear glucose from the blood stream. Lean and fat mass was measured by quantitative magnetic resonance at 1, 2, 6, and 12 months for 39 marmoset infants. Circulating glucose was measured by glucometer; insulin and adiponectin by commercial assays. The QUICKI (a measure of insulin sensitivity) was calculated for subjects with fasting glucose and insulin measures. Oral glucose tolerance tests (OGTT) were conducted at 12 months on 35 subjects.

Results: Subjects classified as Fat (> 14% body fat) at 12 months already had higher percent body fat by 1 month and had both greater lean mass (198.4±6.2g vs 174.0±6.8g, p=.013) and fat mass (45.5±5.0g vs 24.9±3.4g, p=.002) by 6 months. Percent body fat decreased between 1 and 12 months in Normal subjects; in Fat subjects it increased.¹ At 6 months Fat subjects already had significantly lower insulin sensitivity (mean QUICKI = .378±.029 versus .525±.019, N=11, p=.003). At 12 months Fat subjects had lower QUICKI, higher fasting glucose (129.3±9.1 mg/dL versus 106.1±6.5 mg/dL, p=.042) and circulating adiponectin tended to be lower (p=.057). The OGTT results demonstrated that Fat animals had a decreased ability to clear glucose.²

Conclusions: Excess adiposity in captive marmosets develops by 1 month. Early onset obesity in marmosets results in impaired glucose homeostasis by one year.

Literature cited

1. Power ML, Ross CN, Schulkin J, Tardif SD. The development of obesity begins at an early age in captive common marmosets (*Callithrix jacchus*). *Am J Primatol* 2012;74:261-269.
2. Power ML, Ross CN, Schulkin J, Ziegler TZ, Tardif SD. Metabolic consequences of the early onset of obesity in common marmoset monkeys. *Obesity* (in press).