

Stress-coping strategy and mom's stress levels during pregnancy

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Johns Hopkins researchers have found that offspring born to mother rats stressed during pregnancy lost weight faster and failed to turn on appropriate brain hunger signals in response to exercise and food restriction, compared to offspring from non-stressed mothers. The research reveals a specific combination of stress, personality, and environmental factors that may contribute to anorexic behaviors. The findings will be presented this week at the Annual Meeting of the Society for the Study of Ingestive Behavior (SSIB), the society for research into all aspects of eating and drinking behavior.

"This research brings us a step closer toward understanding anorexia vulnerability and provides insight into the development of potential individualized treatment for this eating disorder," says lead author Gretha Boersma, Ph.D., a postdoctoral fellow at Johns Hopkins Medicine.

The researchers mildly stressed pregnant [rats](#) by introducing environmental disturbances. Then, they mimicked the physiological characteristics and some psychological consequences of anorexia nervosa in the offspring by limiting eating time and giving access to a running wheel. That combination leads to severe weight loss, hyperactivity, and voluntary refusal to eat in the presence of food, resembling symptoms of anorexia. The key discovery was revealed when the research team determined the individual offspring's stress-coping style. Rodents and humans typically deal with stress in two distinct coping styles: Proactive individuals actively confront stressors, while

passive individuals try to avoid dealing with them. When confronted with an annoying object in the home environment, a proactive rat will bury it while a passive rat will freeze or try to move away from it. The passive-coping, prenatally stressed offspring showed the strongest resemblance to [anorexia nervosa](#). They lost weight faster than their proactive littermates or passive rats from mothers that weren't stressed.

To explore why the passive-coping rats from stressed mothers lost weight faster, the researchers analyzed the levels of hunger signals in the hypothalamus, the region of the brain that controls hunger and thirst. In normal rats, the chemical signals called agouti-related peptide (Agrp) and orexin increase during [food restriction](#) to promote appetite. But the passive-coping rats did not show increases in Agrp and orexin levels, suggesting these rats lose weight because the hunger signals aren't turned up when they should be.

"The results of this study suggest that we may be able to identify a subgroup of patients, those with a passive stress-coping style and a history of stress during early development, who might be highly vulnerable to anorexia when they start dieting," says Boersma." Identifying ways to control the Agrp and orexin hunger signals may be a treatment option for patients with this specific history".

More information: Research: Rats vulnerable to weight loss during activity-based anorexia lack increased expression of Agrp and Orexin in response to starvation.

Provided by Society for the Study of Ingestive Behavior

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