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YOU ARE INVITED TO ATTEND THE DEFENSE OF THE DOCTORAL DISSERTATION

"The Effects of Social Isolation on Glucose Homeostasis and Hypothalamic Neuropeptide and Receptor Expression in Mice"

By

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Department of Pharmacology, Physiology and Neuroscience

Thursday, September 25, 2025
2:00 PM

Join Zoom presentation

https://rutgers.zoom.us/j/94933248816?pwd=nVfx3q20DMCxul3KybktOlko8bSgVY.1

Meeting ID: 949 3324 8816

Password: 985650

ABSTRACT

Human longitudinal studies demonstrate that social isolation is an independent risk factor for diabetes and associated co-morbidities (e.g. dementia and heart disease). However, the mechanisms underlying the strong association between social isolation and diabetes remain unknown and difficult to study in humans. Rodent models provide an excellent opportunity to investigate this association mechanistically. The relationship between social isolation and glucose dysregulation has been demonstrated in rodents. However, the field lacks clarity with respect to the intrinsic and environmental factors by which social isolation contributes to poor glucose control in otherwise healthy rodent models. Our research advanced the field on multiple fronts. First, we found that three weeks of social isolation leads to reversible post-fasting hyperglycemia in C57Bl/6N male mice. Neither intact nor ovariectomized females had isolation-induced hyperglycemia. Second, we show that re-introducing either somatosensory (temperature) or non-somatosensory (visual/olfactory/auditory) cues confers resilience to isolation-induced hyperglycemia. Third, by investigating immediate early gene expression in the ventromedial hypothalamic nucleus, a glucose-sensing brain structure, we show that social isolation increases activity of neurons that express the receptor for oxytocin, a peptide implicated in social interactions, metabolism, and thermoregulation. Our findings establish a foundation for future mechanistic and epidemiological studies examining how social isolation impacts glucose regulation. This research is particularly urgent in the post-pandemic era, where both social isolation and diabetes are rising in diverse patient populations.