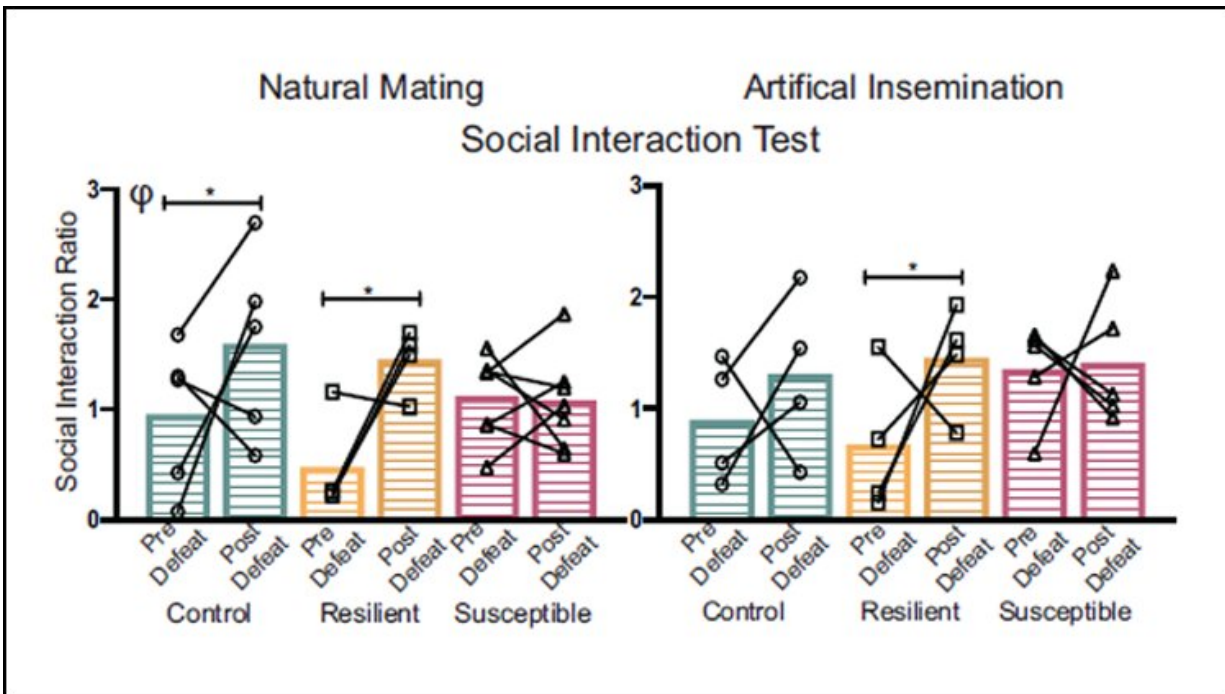


Mice fathers pass down stress responses to offspring via sperm

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Paternal exposure to chronic stress alters stress sensitivity of male offspring in adulthood. In sons produced by natural mating, there was a main effect of chronic stress in social interaction (SI) testing. Control and resilient sons had a higher SI ratio after CSDS exposure, whereas susceptible sons did not show this effect. There was a similar effect in sons produced by artificial insemination. Credit: Cunningham et al., *JNeurosci* 2021

Male mice more susceptible to stress can pass down their behaviors to

offspring via changes in their sperm's genetic code, according to new research published in *JNeurosci*.

Stressful experiences alter [gene expression](#), which parents can pass down to their offspring. But it was unclear if sperm itself transmits this information, or if behavioral cues between the parents play a larger role.

Cunningham et al. tracked the stress response of [male mice](#) after ten days of chronic stress and sorted them into resilient and susceptible groups, based on the severity of their response. The offspring of resilient and control mice showed decreased stress behaviors compared to the offspring of the susceptible mice. The same pattern appeared in offspring conceived via [artificial insemination](#), indicating sperm plays a direct role in the transmission of stress responses. The researchers also sequenced the RNA in the father's sperm—the transcriptome—before and after the chronic stress. Stress changed 1460 genes in susceptible mice but only 62 genes in resilient mice.

These results reveal sperm transmits short-term environmental information to offspring through changes in the transcriptome.

More information: Sperm Transcriptional State Associated With Paternal Transmission of Stress Phenotypes, *JNeurosci* (2021). [DOI: 10.1523/JNEUROSCI.3192-20.2021](#)

Provided by Society for Neuroscience

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