

New model creates an understanding of birth control pills regarding risk, resilience to depression

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While birth control hormones given to mice result in lower stress levels,

the mice showed normal corticosterone responses to stress when given newer formulations of the pill, according to a new University of Michigan study.

The new findings, [published](#) in the journal *Hormones and Behavior*, could aid women suffering from negative symptoms when using an oral contraceptive.

Importantly, [birth control pills](#) have enormous health and [financial benefits](#) for individuals who use them, and this work might shift prescribing practices to lower the chance that women suffer negative symptoms when taking [oral contraceptives](#), says study senior author Natalie Tronson, U-M associate professor of psychology.

Tronson and colleagues expanded the study of brain and behavioral patterns among women who used [hormonal contraceptives](#). While most described having improved mood and lower premenstrual symptoms from birth control pills, up to 10% of overall users experienced adverse effects such as depression and anxiety.

A new "mouse model" of birth control exposure was designed to mimic daily oral contraceptive exposure in humans.

In the study, young female mice drank a once-daily hormone mix, similar to the once-daily pill. One group received a common pill combination ([ethinyl estradiol](#) and levonorgestrel) in a sugar solution, another group received a newer formulation (estradiol and drospirenone) in a sugar solution, and a third group drank only a sugar solution. Researchers studied the mice's behaviors, such as swimming and preference for sugar, as well as their stress levels.

Tronson says that doses containing estrogen and levonorgestrel did not raise stress levels, change activity, motivation, anxiety, or cause changes

in weight gain. Although oral contraceptives did not increase all depression-like behaviors, they did decrease pleasurable responses to sugar.

The researchers note that the suppression of regular estrous cycling—as well as the blunting of the corticosterone response to stress—demonstrate how the "[mouse model](#)" can be used for future studies involving oral contraceptive interactions with stress, motivation, and risk for depression.

More information: Kristen M. Schuh et al, A mouse model of oral contraceptive exposure: Depression, motivation, and the stress response, *Hormones and Behavior* (2023). [DOI: 10.1016/j.yhbeh.2023.105470](https://doi.org/10.1016/j.yhbeh.2023.105470)

Provided by University of Michigan

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