

# Tailoring behavioral therapy for depression, obesity based on how the brain responds

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Precision lifestyle medicine is an emerging field that tailors behavioral treatments and lifestyle modification recommendations based on an individual's genetics, lifestyle and environment.

Researchers at the University of Illinois at Chicago, in collaboration with

their colleagues at Stanford University and the University of Washington, will look at how an integrated behavioral therapy aimed at helping people with co-occurring obesity and [depression](#) can be adapted for individuals based on how their [brain](#) function changes in response to the intervention. They will study whether changes in brain function predict the effect of the intervention on [health behaviors](#), as well as weight and depression outcomes.

The research, which is funded by a two-year, \$2.5 million grant from the National Institutes of Health, is based on previous work by the group on the efficacy of the intervention. This new award funds an ongoing study that is part of the NIH Office of the Director's Science of Behavior Change Common Fund Program.

In the first phase of the study—which was funded by a \$2.5 million, three-year grant from the NIH—the researchers identified circuits in the brain involved in emotion regulation and cognition that might predict or affect individual patient responses to the integrated behavioral therapy for treating both obesity and depression at the same time. In the second phase of the study, the researchers will further examine how to adapt the integrated therapy to target changes in [brain function](#) and health behaviors that they believe, based on their phase 1 findings, are associated with better [weight loss](#) and depression outcomes.

"We want to be able to understand the underlying fundamental neurobiological mechanisms that are involved in self-regulation so we can hone in on these as therapeutic targets for [cognitive behavioral therapy](#) for obesity and depression," said Dr. Jun Ma, professor of medicine in the UIC College of Medicine and co-principal investigator on the grant. "Does our integrated intervention change the function of specific circuits in the brain that regulate emotions, cognition and or self-awareness? That is one of the questions we will seek to answer. Knowing how cognitive behavior therapy changes the activation and connectivity

of these [brain circuits](#) in relation to behavior change, and for which subpopulations or under what conditions, can help us tailor the right therapeutic approach to the right patient in the right context for improved outcomes."

In the first part of the study, the researchers investigated how participants responded to an integrated behavioral therapy that combines evidence-based behavioral weight loss treatment and collaborative depression treatment that included problem-solving therapy and, when appropriate, antidepressant medication management. The researchers used functional magnetic resonance imaging to see if and how the prescribed behavior changes affected the brain in three areas of focus: emotional regulation, cognitive control and self-focused reflection. "We were asking questions such as, 'Can we reliably measure the activation and connectivity of brain circuits in each of these areas? Do the measures change in a meaningful way in response to the intervention?'" Ma said.

Based on what they saw in the brain circuit measures and in changes in health behaviors, as well as weight loss and depression outcomes in phase 1 of their study, the researchers will further modify the intervention to see if they can achieve better results in phase 2. While the researchers are still analyzing their data from phase 1, Ma said that early results already are shedding new light on the connection of brain and behavior in the management of multiple chronic conditions.

In phase 2 of the study, Ma and her colleagues will recruit a new group of 105 participants who are patients at UIC who have co-occurring depression and obesity. They will apply what they learned about adapting their integrated behavioral therapy in the first part of the study to determine if they can help these participants achieve better outcomes. This part of the study will last two years.

"We are especially looking forward to this second part of the study because we are anticipating enrolling a more racially/ethnically and socioeconomically diverse group of patients," Ma said. "Depression and obesity tend to disproportionately affect minority populations like the ones we see at UI Health, and because every patient can benefit from tailored [therapy](#), we are excited to see if there are novel mechanisms at work in these populations that we can identify and target to reduce health disparities."

Dr. Olusola Ajilore, Dr. Ben Gerber, and Michael Berbaum from UIC are co-investigators on the grant. Dr. Leanne Williams at Stanford University is co-principal investigator on the grant. Dr. Mark Snowden is the sub-award principal investigator at the University of Washington.

Provided by University of Illinois at Chicago

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