Infant blood markers predict childhood mental health

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Credit: AI-generated image (disclaimer)

Stanford researchers have shown that levels of cholesterol and fat in a newborn's blood can reliably predict that child's psychological and social health five years later. If confirmed, the discovery could point to new ways for monitoring or treating mental illnesses, such as depression, early on in childhood.

The results correlated lipids in newborn's umbilical cord blood with teacher ratings of the children's mental health at about five years of age. Children born with more "bad" cholesterol and triglycerides (a type of fat, or lipid, that circulates in the blood) were more likely to receive poor teacher ratings than were their peers with higher levels of "good" cholesterol and lower triglyceride levels.

Psychology professor Ian Gotlib was senior author on the study published in *Psychological Science*. He said the next step is to find out whether the role of fat is merely correlative, and thus serving as a marker of the root biological processes at work, or actually causative, and therefore a promising target for therapeutic interventions such as dietary changes or pharmaceuticals.

"Our study is a launchpad into so many other lines of research," said Gotlib, who is the David Starr Jordan Professor in the Department of Psychology at Stanford's School of Humanities and Sciences. "We are excited to see where this goes."

Erika Manczak, lead author on the study, began the work as a postdoctoral fellow in Gotlib's lab. "It is surprising that from so early in life, these easily accessible and commonly examined markers of blood lipid levels have this predictive correlation for future psychological outcomes," said Manczak, who is now an assistant professor of psychology at Denver University. "What our study showed is really an optimistic finding because lipids are relatively easy to manipulate and influence."

The scientists don't yet know how fat levels might be related to the observed psychological behavior in children. But the findings dovetail with growing evidence concerning the influence of fat on immune system function. In adults, some studies have found a role for the immune system in maintaining psychological wellbeing. By extending

this investigation into children, the Stanford study begins to reveal factors related to the onset of emotional difficulties and mental illnesses, which are on the rise globally.

"The prevalence of depression is increasing with every generation at every age, along with suicide attempts and completions," Gotlib said. "Over the last few decades, we've done a wonderful job of reducing the rates and impact of many physical disorders. Yet we've done poorly in reducing mental disorders. Finding potential new early predictors of mental health, as this study has, is therefore a critical step forward."

Delving into the data

For the study, the Stanford researchers analyzed a dataset compiled by the Born in Bradford project. Based in Bradford, the sixth-largest city in the United Kingdom, the project follows children born between March 2007 and December 2010, as well as their parents, to learn more about common childhood illnesses along with mental and social development.

Manczak and Gotlib examined lipid profiles for 1,369 newborns, noting levels of triglycerides, high-density lipoprotein (HDL, also known as "good" cholesterol) and very low-density lipoprotein (VLDL, also known as "bad" cholesterol).

They then compared these cholesterol and triglyceride levels with teachers' psychological evaluations of students at the end of the U.K. equivalent of kindergarten. The teachers rated children's competence in emotion regulation, self-awareness, and interpersonal relationships. Manczak and Gotlib's findings indicate that kids with the more favorable psychological indicators were born with higher HDL and lower VLDL or triglycerides than children who scored lower in these traits.

Importantly, this correlation was consistent even in people of different

ethnic and socioeconomic backgrounds, which suggests that household income, access to health care, diet and other social factors do not underlie the relation between blood markers and psychological indicators. The group also ruled out the children's general physical health (assessed by parents at age three), the children's body mass index at approximately the time of the teacher evaluations, placement in special education classes, the health of mothers prior to and during pregnancy, including any history of depression and whether the mother took prenatal vitamins, as factors that could explain the teachers' assessments.

"The fact that the only solid predictor for the Born in Bradford children's psychosocial competency assessment scores was their fetal lipid levels really argues in favor of a connection between the two," Manczak said. "Now we need to find out what exactly this connection may be."

Putting it all together

The researchers suggest one explanation for these results could be that unfavorable lipid levels contribute to immune system dysfunction, resulting in bodily inflammation. The molecules involved in inflammation can cross into the brain, influencing fetal and childhood development as well as long-term psychological wellbeing and, at least in the shorter term, mood, motivation and outlook.

"Bad cholesterol might promote greater inflammation across the body that influences the way children's brains are developing or acting," Manczak said. "That might ultimately be enough to nudge them on certain psychological trajectories."

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