Gut feelings: How the microbiome may affect mental illness and interact with treatment

December 7 2016

All of us who have experienced a "nervous stomach" under periods of stress suspect that there is a link between our gut and our mood. This link received strong scientific support during a series of presentations at the recent meeting of the American College of Neuropsychopharmacology.

As noted by Dr. Vicki Ellingrod - the Chair of this session, "Current state-of-the-art research in both animal models as well as humans point to the link between the gut microbiota and mood and anxiety models, as well as the potential for psychiatric medications to directly affect the gut microbiome."

This link was most convincingly demonstrated when changes in the diversity of microorganisms living in the gastrointestinal system were measured while rats were subjected to chronic stress over a 7-week period. Not only did the number of microorganisms decrease as stress became more chronic, behavioral changes suggested that the rats also began experiencing loss of pleasure and "despair-like" behavior. Moreover, when these microorganisms were transferred from the stressed rats to a new group of animals that had not been stressed, Dr. Emily Jutkiewicz found that these new animals also began to demonstrate these same behavioral changes after 5 days, suggesting a potential causal mechanism.

Treatment implications were examined in a series of human studies that demonstrated similar reductions in the microbiome in participants

suffering from both major depression and bipolar disorder. These changes were associated with increased anxiety and sleep problems, and with increased complaints of general health problems. Referring to these associations in bipolar subjects, Dr. Simon Evans concluded that, "The data support the hypothesis that targeting the microbiome may be an effective treatment paradigm for bipolar disorder."

The role of medications was examined during the final two presentations. By studying individuals over time, Dr. Chadi Calarge was able to examine microbiome changes when individuals were depressed or in remission, and when they were and were not receiving anti-depressant medications (SSRIs). While no changes in gut bacterial diversity was seen in patients with depression, species-level differences were observed. In addition, starting SSRI treatment was associated with increased Indoles production, implicating changes in tryptophanase-producing bacteria. In addition, preliminary evidence suggests the presence of increased intestinal permeability in depression, potentially leading to increased bacterial translocation.

Finally, changes in how our body metabolizes energy, and resulting weight gain can be a troubling side effect of atypical antipsychotic (AAP) medications. In the final presentation of the day, Dr. Stephanie Flowers showed that female bipolar participants who gained weight with AAP treatment, had a greater reduction in microbiome diversity than did female bipolar patients who were also being treated with AAP medications but did not gain weight, suggesting that the health of our gut may also put us at increased risk for certain medication side effects.

Abstract summaries of this research are published in the journal, *Neuropsychopharmacology*.

Provided by American College of Neuropsychopharmacology