Adverse Childhood Experiences and Obesity Linked to Indicators of Gut Permeability and Inflammation

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Objectives: Gut permeability appears to increase cardiovascular disease risk by allowing bacterial components to enter the bloodstream, leading to low-grade inflammation. Emerging evidence suggests that psychosocial stress promotes gut permeability, but the effect of chronic stress induced by adverse childhood experiences (ACEs) on the gut barrier remains unclear. Moreover, the existence of an additive effect of psychological stressors and nutritional factors that increase gut permeability – such as obesity – is unknown. We aimed to: 1) investigate the effect of ACEs on gut permeability indices, and 2) examine whether high ACE status and obesity in combination have a greater, negative effect on indicators of gut permeability and inflammation than either alone.

Methods: Women (N = 79, aged 18–84 y) free of cardiometabolic diseases (other than obesity) and inflammatory conditions and not regularly taking anti-inflammatory medications were included in a 2 × 2 factorial design with ACE status (either 0 ACEs or 3 + ACEs) and body mass index (BMI) (either normal-weight [18.5–24.9 kg/m^2; NW] or obesity [>30 kg/m^2; OB]) as factors (n = 15–27/group). Fasting serum was obtained and markers of gut permeability (i.e., lipopolysaccharide [LPS] binding protein; fatty-acid binding protein-2 [FABP2]; anti-LPS core IgM; soluble CD14 (sCD14) and inflammation (i.e., C-reactive protein [CRP]; tumor necrosis factor [TNF]-α; interleukin [IL]-6) measured. Data were analyzed using 2-way ANCOVA (age-adjusted) with SPSS 26.

Results: LPS binding protein and FABP2 were higher in OB versus NW, regardless of ACE status ($P_{BMI} \leq 0.04$). Higher ACE status was associated with increased circulating anti-LPS core IgM ($P_{ACE} = 0.04$), but BMI had no effect. sCD14 was unaffected by BMI or ACEs. CRP was elevated in OB vs. NW ($P_{BMI} < 0.001$) and tended to be higher with 3 + ACEs compared to 0 ACEs ($P_{ACE} = 0.06$). Moreover, TNF-α was greater in 3 + ACEs relative to 0 ACEs ($P_{ACE} = 0.03$). IL-6 was unaltered by BMI or ACE status. No interaction effects were observed for any marker of gut permeability or inflammation.

Conclusions: High ACE status and obesity were independently associated with evidence of gut permeability and inflammation, but no combination of BMI and ACE status affected these measures.

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