

Intermittent fasting and gut microbiota

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See "Islamic fasting leads to an increased abundance of *Akkermansia muciniphila* and *Bacteroides fragilis* group: A preliminary study on intermittent fasting" on page 1032.

Many functions of gastrointestinal system are time-dependent. Body clock works in synchrony with organs of the body and even gut microbiota (1). Recent attention for intermittent fasting dramatically increased in majority (2). Rodent studies indicate that the gut microbiome is highly variable, changing daily cyclical fluctuations in diversity (3,4). Intermittent fasting might directly affect gut microbial composition, function and interaction with the host. There are diverse types of intermittent fasting behavior (5):

1. Complete alternate-day fasting,
2. Modified fasting regimens,
3. Time-restricted feeding,
4. Religious fasting,
5. Ramadan fasting and
6. Other religious fasts.

Ramadan fasting is from sunrise to sunset during the holy month of Ramadan. People eat a large meal after sunset and a lighter meal before sunrise. Fasting period is approximately 12 hours; however, it depends on the geographical location, varying between 11 to 22 hours. Another aspect of Ramadan fasting is water and all other liquid intake is also prohibited. In summary, it is a nil per os regimen.

Meta-analysis of metabolic health and biomarkers during Ramadan fasting showed some benefit in LDL cholesterol and fasting glucose levels. However, serum triglycerides and HDL cholesterol were usually unchanged. There is a modest weight loss (approximately 1.24 kg) during fasting but this is regained rapidly during 2 weeks of period (6).

Recent studies show beneficial effects of fasting on metabolic markers. Li G et al showed that intermittent fasting promotes white adipose browning and decreases obesity by changing the gut microbiota. The altered functions of gut microbiota in fasting group induce beige formation (white adipose tissue to brown adipose tissue transition-which is a beneficial reaction). Gut microbiota fermentation products such as acetate and lactate in-

crease during fasting. These products together with up-regulation of monocarboxylate transporter 1 expression in beige cells, ameliorates obesity, insulin resistance and hepatic steatosis (7).

Although intermittent fasting has probably some metabolic benefits, some authors claim the hazardous effect of Ramadan fasting on general health status. The reason for this claim is that Ramadan fasting feeding pattern is in biological opposition to circadian rhythms and, therefore, not a desirable healthy eating pattern (5).

In this issue of Turkish Journal of Gastroenterology, a research on variations of gut microbiota in Ramadan fasting is presented. This is the first study on microbial signatures associated with Ramadan fasting. Results of the study indicated increased amounts of *Akkermansia muciniphila* (signature of metabolic health) at the end of the fasting period (approximately one month). However, the results show a short-term microbiota improvement. Many studies showed a "flash-back" effect of Ramadan fasting after returning to habitual diet (8). We need long-term studies on microbiome of these people for durability of microbial improvement in this population.

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