Specific synbiotics in early life protect against diet-induced obesity in adult mice

CONCLUSION
The findings show the potential and importance of timing of synbiotic interventions in early life during crucial microbiota development as a preventive measure to lower the risk of obesity and improve metabolic health throughout life.

STUDY BACKGROUND
The metabolic state of human adults is associated with their gut microbiome. The symbiosis between host and microbiome is initiated at birth, and early life microbiome perturbation can disturb health throughout life.

STUDY OBJECTIVES
To determine how beneficial microbiome interventions in early life affect metabolic health in adulthood.

STUDY DESIGN
Litters were culled at postnatal day (PN) 2 and were randomly divided into 4 diet groups until postnatal (PN) day 42:

- Reference (REF) and Control (CTRL) groups receiving AIN-G (standard semi-synthetic diet appropriate for breeding) plus control component (maltodextrin)
- PRE group receiving AIN-G supplemented with prebiotics (scGOS/lcFOS, 9:1)
- SYN group receiving AIN-G, supplemented with synbiotics (scGOS/lcFOS, 9:1 + Bifidobacterium breve M-16V)

CTRL, PRE and SYN groups were subsequently challenged with a high-fat Western-style diet (WSD) for 8 weeks.

Food intake did not differ between groups. To test the robustness of the findings, the study was repeated in a second animal facility.
Key results

Early life synbiotic supplementation increased the abundance of *Bifidobacterium*.

Early life synbiotic supplementation provided long-term protection against diet-induced excessive fat accumulation.

SYN group showed a trend towards reduced HOMA-IR (*P* = .067) compared with the CTRL group (data not shown), suggesting improved insulin sensitivity. This effect was driven mainly by reduced insulin levels (*P* = .039) in the SYN group compared with the CTRL group.

Total plasma cholesterol was significantly reduced in the SYN group compared with the CTRL group (*P* = .003), resembling REF group levels.

Increased plasma levels of beta-hydroxybutyrate (*P* = .047) in the SYN group compared with the CTRL group (data not shown) indicated higher fatty acid oxidation, which might contribute to protection against obesity and improved glucose metabolism.

Early life synbiotic supplementation improved insulin sensitivity and dyslipidaemia in adulthood

**Reference**