



## Transforming bitter vegetable flavour acceptance by in utero exposure: tailoring and targeting interventions for pregnant women

### Background

Diet and nutrition are critical to human health. Consuming recommended quantities of fruits and vegetables significantly reduces risk of non-communicable diseases (e.g. heart disease, type-2 diabetes). However, 82% of UK children do not eat enough fruits and vegetables with 'disliking' being key to low intake, and intake is particularly low in families living in poverty and food insecurity. Furthermore, bitter (cruciferous) vegetables, such as cabbage or kale, are particularly beneficial for health but poorly accepted by children and adults alike.

### Aims and Methods

To be tested is a low-cost mechanism which could improve bitter vegetable acceptance from the earliest stages of life. Flavour preference begins in-utero: flavours are experienced via amniotic fluid (AF), creating a 'flavourscape', which varies depending on maternal diet.

Bitter vegetables are typically a) most challenging to get infants to accept and b) least liked and consumed by parents. Thus, supplementation with capsules might be practical for those pregnant women who do not have regular reliable access to fresh green vegetables or who dislike their flavour. Fetal flavour exposure is therefore, an underexploited, cheap and potentially powerful tool to predispose infants to accept healthier flavours.

### Relevance

This study will generate the scientific knowledge and practical recommendations to optimise flavour experiences of the fetus and maximise postnatal bitter vegetable acceptance in the infants of women living in poverty and food insecure settings. A recent NICE review of interventions aiming to improve pregnancy diet concluded that providing information alone is not sufficient to drive dietary

change in pregnancy, and that poverty and food insecurity are commonly affecting pregnant women's ability to follow healthy eating advice. Overall, this project will establish fundamental knowledge and tools for optimisation of uterine bitter flavour experiences to maximise health outcomes from the earliest stages of life.

### Training

The project will provide training on prenatal and postnatal assessments. Prenatally training will be provided on fetal ultrasound assessment, the fetal coding system and using the OBSERVER software to code fetal movements. Postnatal assessment training will be provided for home visits and video analysis. Furthermore, training for self-report measures will be provided.

### Suitable for

PhD and MSc by Research students.

### References

Ustun, B., Reissland, N., Covey, J., Schaal, B., & Blissett, J. (2022). Flavor sensing in utero and emerging discriminative behaviors in the human fetus. *Psychological science*, 33(10), 1651-1663.

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<https://www.nice.org.uk/guidance/ng247/evidence/i-interventions-to-increase-uptake-of-healthy-eating-and-drinking-advice-during-pregnancy-pdf-13620108501>