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The effect of prebiotic supplementation on asthma

Submission date	**Recruitment status**	[X] Prospectively registered
17/05/2021	No longer recruiting	[ ] Protocol
Registration date	**Overall study status**	[ ] Statistical analysis plan
19/05/2021	Completed	[ ] Results
Last Edited	**Condition category**	[ ] Individual participant data
19/05/2021	Respiratory	[ ] Record updated in last year

Plain English summary of protocol

Background and study aims
Many prevalent health disorders (including asthma) cause patients to have increased levels of inflammation. A potential cause for the increased inflammation could be due to the types and activity of the bacteria that reside in the gut (gut microbiota). Evidence suggests that in asthma, the gut becomes more permeable which could contribute to increased levels of inflammation. However, the human gut is also home to many strains of beneficial bacteria, such as Bifidobacterium and Lactobacilli, which when is sufficient amounts can exert a health benefit and reduce systemic inflammation.
Dietary prebiotics, a form of non-digestible carbohydrate, are shown to encourage the growth and activity of beneficial bacteria and can confer a health benefit. Recent nutritional research into prebiotics has highlighted their potential to improve digestive health, and to have an effect on the immune system and inflammatory responses. Prebiotics may help modulate systemic inflammation in asthma, improving disease management. This study aims to assess the effects of a 3-week prebiotic supplementation period on asthma control and markers of systemic inflammation.

Who can participate?
Patients aged 18-50 with a GP diagnosis of asthma and a current asthma medication prescription,

What does the study involve?
Participants are recruited Into a 9-week study involving five visits to the laboratory. Visit one is a familiarisation session, with visits 2, 3, 4 and 5 occurring before and after each 21-day intervention period. At each visit participants will perform lung function tests, have a blood sample taken, provide a saliva sample and have their body composition assessed with a scan, and complete asthma control, asthma quality of life, and asthma medication questionnaires. Participants will complete two 3-week dietary intervention periods (taking a daily prebiotic powder or placebo (dummy) powder) with a two-week washout period between each intervention.

What are the possible benefits and risks of participating?
Participants will undergo an in-depth personalised assessment of asthma. This will collect information regarding lung function, and the assessment of forced expiratory volume, which

means the amount of air a person can forcefully exhale in one second. Other lung measurements will also be recorded. In terms of the nutritional supplements, no specific benefits are anticipated. However, it is possible that asthma symptoms may be reduced. Slight discomfort may occur during blood sampling, but all investigators taking blood samples will be fully trained and will take the utmost care. Although very rare some individuals may feel symptoms of digestive discomfort such as bloating and abdominal cramps during the prebiotic supplementation period.

Where is the study run from?
Nottingham Trent University (UK)

When is the study starting and how long is it expected to run for?
October 2019 to September 2023

Who is funding the study?
Nottingham Trent University (UK)

Who is the main contact?
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Contact information

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Scientific

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Additional identifiers

Protocol serial number
NTU Ethics Committee Approved Protocol #675

Study information

Scientific Title
The effects of a prebiotic supplement on quality of life, control of asthma, and markers of systemic inflammation in adults with asthma: a double-blind, placebo-controlled, crossover trial

Study objectives
It is hypothesised that a prebiotic galacto-oligosaccharide mixture (B-GOS) will reduce markers of systemic inflammation whilst improving quality of life, and asthma control in adults with asthma.

Ethics approval required
Old ethics approval format

Ethics approval(s)
Approved 24/03/2021, Nottingham Trent University College of Science and Technology Ethical Committee (Humans) (New Hall Block Room 178, Clifton Lane, Nottingham, NG11 8NS, UK; +44 (0)115 84 83461; dianne.levey@ntu.ac.uk), ref: #675

Study design
Single-centre randomized double-blind placebo-controlled cross-over controlled study

Primary study design
Interventional

Study type(s)
Treatment

Health condition(s) or problem(s) studied
Asthma

Interventions
Participants are randomized by block randomisation for two 21-day treatment periods with a 2-week washout between treatments:
1. Prebiotic Bimuno galactooligosaccharide powder – 5.8 g of galactooligosaccharide provided daily in two 2.9 g dose. One sachet taken in the morning and one in the evening.
2. Placebo maltodextrin powder (Clasado Ltd, Milton Keynes, UK) – 5.8 g of maltodextrin, provided in two 2.9 g doses. One sachet taken in the morning and one in the evening for 3 weeks.

Intervention Type
Supplement

Primary outcome(s)
Pro-inflammatory markers including c-reactive protein, Th2 cytokines, Th1/17 cytokines, NFkB and TNFa measured using enzyme-linked immunosorbent assay and multiplex bead array assays at day 0 and day 21

Key secondary outcome(s))
1. Asthma control measured using the asthma control questionnaire (ACQ) at day 0 and day 21 of each intervention period
2. Asthma individual quality of life measured using the asthma quality of life questionnaire (AQLQ) at day 0 and day 21 of each intervention period
3. Use of asthma medication during the study measured using medication adherence report scale - for asthma (MARS-A) at day 0 and day 21 of each intervention period
4. Body composition measured using dual X-ray absorptometry (iDXA) at day 0 and day 21 of each intervention period

Completion date
01/09/2023

Eligibility

Key inclusion criteria
1. Aged 18-50 years of age
2. Body mass index (BMI) of 18.5-35 $kg \cdot m^2$
3. Non-smoker
4. Asthma severity defined as Steps 1 to 5 based on British Thoracic Society guidelines
5. Current asthma diagnosis and medication prescription from GP (e.g. maintenance and reliever inhalers)
6. In the researcher's opinion, able and willing to follow all the trial requirements
7. Potential participants must disclose any nutritional supplements they take to the researcher, to determine whether these may be considered as exclusion criteria

Participant type(s)
Healthy volunteer

Healthy volunteers allowed
No

Age group
Adult

Lower age limit
18 years

Upper age limit
50 years

Sex
All

Key exclusion criteria

1. Suffer from asthma but do not have a current medication prescription from GP (e.g. maintenance and reliever inhalers)
2. Regularly consume Omega-3 supplements, and/or eat high levels of Omega-3 (e.g. more than 1-2 portions of oily fish such as salmon or mackerel a week).
3. Take aspirin or other non-steroidal anti-inflammatory drugs such as ibuprofen once a day on 5 of the 7 days of the week
4. Females only: pregnant or planning a pregnancy during the time of the study (on each visit participants will be asked to complete a pregnancy test if within childbearing age)
5. Consumed prebiotics and/or probiotics (supplements), drugs that affect gastrointestinal mobility or laxatives in the 4 weeks before signing the consent form
6. Vegetarian or vegan diet
7. Previously diagnosed with chronic obstructive pulmonary disease (COPD), emphysema, chronic bronchitis, or similar respiratory (breathing-related) illness
8. Admitted to hospital during the past 12 months for asthma
9. History of heart failure, pulmonary hypertension, embolism, or other pulmonary heart disease
10. History of recurrent chest infections
11. Acute infection in the last 4 weeks and/or major operation in the past 4 months
12. History of gastrointestinal drug reaction
13. Taken antibiotics in the past 3 months
14. History or current evidence of gastrointestinal disease (e.g. chronic constipation, diarrhoea, irritable bowel syndrome, Crohn's disease)
15. Recently taken part in other research projects. Please notify the chief investigator
16. Are or believe they may be lactose intolerant
17. Regularly take antioxidant supplements, such as beta-carotene, vitamin A, vitamin C, vitamin E, lutein and selenium
18. Standard multivitamin and mineral supplements are acceptable; however, If a single antioxidant supplement (e.g. Vitamin C) is more than the recommended daily Dietary Reference Values (DRVs) this must be checked with the chief investigator

Date of first enrolment
01/11/2021

Date of final enrolment
12/12/2022

Locations

Countries of recruitment
United Kingdom

England

Study participating centre
Nottingham Trent University
School of Science and Technology
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Sponsor information

Organisation
Nottingham Trent University

ROR
https://ror.org/04xyxjd90

Funder(s)

Funder type
University/education

Funder Name
Nottingham Trent University

Alternative Name(s)
NTU

Funding Body Type
Private sector organisation

Funding Body Subtype
Universities (academic only)

Location
United Kingdom

Results and Publications

Individual participant data (IPD) sharing plan
The datasets generated and/or analysed during the current study during this study will be included in the subsequent results publication.

IPD sharing plan summary
Other