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Can a blood test predict which people have an allergic asthma response when they breathe in cat allergen?

Submission date
14/03/2020

Recruitment status
No longer recruiting

Registration date
16/04/2020

Overall study status
Completed

Last Edited
10/10/2023

Condition category
Respiratory

[X] Prospectively registered
[_] Protocol
[_] Statistical analysis plan
[_] Results
[_] Individual participant data
[_] Record updated in last year

Plain English summary of protocol

Background and study aims
Asthma is one of the commonest lung conditions in the UK. Many people with asthma and allergy live with pets at home. This can make their symptoms worse. Because people are often exposed to many things around them at once, it can be difficult for patients with asthma and allergies to tell if it is their pets making their symptoms worse. Unfortunately, currently there is no easy test to diagnose this. Generally doctors advise removal of pets, but this is not always easy and might not be necessary if the pets are not making the symptoms worse.
This study focuses on cat allergy. The researchers hope that by doing this research, we can help doctors to better diagnose cat allergy in asthma and give people the right advice about the impact of their cat on their asthma. With further research, the results of this study could potentially be expanded to other allergies too.

Who can participate?
People aged between 18 and 65 who may either have cat allergy or mild asthma. People who are pregnant or have been heavy smokers or have been generally unwell cannot participate.

What does the study involve?
The first stage is a skin-prick test to understand which common allergens participants are allergic to. If they are allergic to cat allergen, they will have the relevant medical history taken, tests of lung function including tests using a substance that narrows the airways and a further skin prick test to measure how allergic they are to cat allergen. Participants will also provide a blood sample to be tested using the new blood test the researchers are developing. The next day, participants will undergo tests where they breathe in air containing cat allergen and their lung function is measured. Blood, breath and sputum (coughed-up mucus) will be taken. Participants will be visited at home the next day and called 3-5 days after the tests to find out if they had any side effects or felt unwell after the study.

What are the possible benefits and risks of participating?
By taking part in the study the participants will get a comprehensive assessment of their lung health and they will be able to find out whether they are sensitive to some allergens. The

researchers will do some routine tests and some specialist tests not available in general practice. This will allow participants to understand how well their lungs are functioning.
Inhaled allergen challenge (where the allergen is breathed in under test conditions) has been used widely in asthma asthma. It is mostly well-tolerated and is considered to be safe. During the inhaled allergen test, the airway (windpipe) may narrow a little. If this occurs, participants may develop breathlessness, wheeziness, chest tightness, cough, flushing or headache. Throughout the study, doctors will be present at all times to look after the participants. They will give participants a rescue (blue reliever) inhaler to ease their symptoms if this is necessary. They will continue to monitor them for up to 8 hours. This is because some people may develop delayed narrowing of their airways. Serious side effects are not common, but the researchers will give participants advice and instructions just in case they start to have more symptoms. They will be provided with instructions on how to monitor their symptoms and given contact details of the study doctor in case they need advice after the inhaled challenge. The research team will visit participants the next day to ensure they remain well.
In the very unlikely event of a severe allergic reaction to the inhaled allergen test, the researchers may ask participants to stay overnight in the hospital for close observations until they recover. This risk is very small but any allergic reaction is taken seriously. All staff are trained in managing allergic reactions.

Where is the study run from?
University of Manchester (UK)

When is the study starting and how long is it expected to run for?
March 2019 to May 2024

Who is funding the study?
The Jon Moulton Charity Trust (UK)

Who is the main contact?
Dr Clare Murray; clare.murray@manchester.ac.uk

Contact information

Type(s)
Public

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Additional identifiers

Integrated Research Application System (IRAS)
268799

Study information

Scientific Title
Effector cell assay for predicting clinical cat allergy in asthma

Acronym
ForeCAst

Study objectives
To assess whether the effector cell assay can predict clinical reactivity to inhaled cat allergen in adults with cat sensitisation

Ethics approval required
Old ethics approval format

Ethics approval(s)
Approved 30/06/2020, London - Riverside REC (Level 3, Block B, Whitefriars, Lewins Mead, Bristol, BS1 2NT, UK; +44 (0)207 1048340; no email provided), REC ref: 20/LO/0817

Primary study design
Observational

Study design
Open-label case-control study

Study type(s)
Diagnostic

Health condition(s) or problem(s) studied
Cat sensitised allergic asthma (mild)

Interventions
Peripheral blood test for effector cell assay to predict inhaled allergen challenge response to cat allergen

Participants will be enrolled and consented. The researchers will perform a skin prick test to common inhaled allergens to confirm cat sensitisation at visit 1. If participants are found to be sensitised to cat allergen in the skin prick test, the researchers will then collect clinically relevant history, take blood to be tested using the effector cell assay, and conduct tests of lung function, methacholine challenge and skin prick titration of cat allergen. If, however, participants are not sensitised to cat on skin prick test, or not positive in methacholine challenge, the participant will be withdrawn from the study. 24 h later, the researchers will perform an inhaled cat allergen challenge test. Blood breath and sputum samples will be taken during this test. A brief home visit will occur the following day to ensure participants are well. A final phone call will be made 3-5 days following the home visit to ask about any adverse events and to conclude the study. The study is carried out over 2 to 3 clinical visits at Manchester University NHS Foundation Trust.

Intervention Type
Other

Primary outcome(s)
1. Effector cell activation assessed using area under the curve (AUC) from results of effector cell assay in blood sample taken at visit 1
2. Cumulative inhaled dose of allergen (PD20; the cumulative inhaled dose of allergen causing a 20% drop in FEV1) during the inhaled cat allergen challenge test

Key secondary outcome(s)
1. Concentration at which maximal activation occurs (CD-max) assessed using the effector cell assay using blood samples taken immediately before inhaled allergen challenge
2. Threshold sensitivity (CD-sens) of the effector cell assay using blood samples taken immediately before inhaled allergen challenge
3. Methacholine PC20 (the concentration of methacholine causing a 20% drop in FEV1) measured by spirometry at visit 1
4. Airway resistance during inhaled allergen challenge measured using spirometry (medical lung function test) and oscillometry (medical lung physiology test) at 20 min, 30 min, 45 min, 60 min, 90 min, 2 h, 3 h, 4 h, 6 h and 7 h after last inhaled dose of allergen in the allergen challenge test
5. Concentration of cat allergen causing 2 mm x 2 mm wheal size measured in the skin prick test at visit 1
6. Adverse events recorded in follow-up visit and call to participants after performing inhaled allergen challenge (up to day 5 post challenge)

Completion date
01/05/2024

Eligibility

Key inclusion criteria
1. Written informed consent
2. Clinical diagnosis of mild asthma (Global Initiative for Asthma [GINA]) step 1 with no regular

inhaled corticosteroids [ICS]) or report of symptoms on exposure to cat or evidence of sensitisation to cat (defined as historical skin prick test >3 mm in wheal size at screening or raised specific IgE to cat >0.34 kU/l)
3. Aged 16-65 years

Participant type(s)
Patient

Healthy volunteers allowed
No

Age group
Adult

Lower age limit
16 Years

Upper age limit
65 Years

Sex
All

Key exclusion criteria
Current exclusion criteria as of 10/10/2023:

1. GINA step 2 or above treatment or any asthma medication with the exception of infrequent (less than twice weekly) short-acting beta-agonist
2. Unwilling or unable to stop antihistamine
3. Previously inability to perform acceptable and repeatable spirometry manoeuvres.
4. Exacerbation of asthma in last 4 weeks requiring an increase or starting of an ICS or OCS
5. Current upper respiratory tract infection
6. Lower respiratory tract infection or pneumonia in the last 6 weeks
7. Previous anaphylaxis or severe reaction to cat.
8. Previous near fatal asthma attack or previous admission to intensive care unit for asthma and allergy
9. Current smokers (excluding occasional social smoking) or pack year history >10 years; abstinence of less than 6 months
10. Significant other primary pulmonary disorders other than asthma
11. Inability to perform test manoeuvres consistently.
12. Significant cardiovascular or cerebral vascular diseases including but not limited to severe hypertension (systolic>200mmHg or diastolic >100mmHg), myocardial infarction, unstable angina or stroke, known aortic aneurysm.
13. Recent eye surgery or any condition where raised intracranial pressure (caused by forceful exhalation).
14. Patient who are undergoing allergen immunotherapy
15. Patient who are taking immune modulating agents including but not limited to: omalizumab, anti-IL-5, anti-IL4/13 monoclonal antibodies over the past year.
16. Other severe or uncontrolled atopic diseases including severe eczema, rhinitis and rhinoconjunctivitis
17. Pregnancy or breast-feeding

18. Unable to give consent
19. History of psychiatric illness, drug or alcohol abuse which may interfere in participation of the trial.
20. Concomitant disease or condition that could interfere with, or for which the treatment of might interfere with the conduct of the study, or that would, in the opinion of the investigator, pose an unacceptable risk to the subject in this study.
21. Unsuitability as defined by research doctor
22. Participation in any other ongoing clinical trial or research of which the intervention may affect the study outcome of the current study, or the intervention in the current study would affect the other ongoing research.

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Previous exclusion criteria:

1. GINA step 2 or above or treatment with any asthma medication with the exception of infrequent (less than twice weekly) short-acting beta-agonist
2. Unwilling or unable to stop antihistamine
3. Previously inability to perform acceptable and repeatable spirometry manoeuvres
4. Exacerbation of asthma in last 4 weeks requiring an increase or starting of an ICS or oral corticosteroid (OCS)
5. Current upper respiratory tract infection
6. Lower respiratory tract infection or pneumonia in the last 6 weeks
7. Previous anaphylaxis or severe reaction to any allergen
8. Previous near-fatal asthma attack or previous admission to intensive care unit for asthma and allergy
9. Current smokers or pack year history >10 years; abstinence of less than 6 months
10. Significant other primary pulmonary disorders other than asthma
11. Inability to perform test manoeuvres consistently
12. Significant cardiovascular or cerebral vascular diseases including but not limited to severe hypertension (systolic >200 mmHg or diastolic >100 mmHg), myocardial infarction, unstable angina or stroke, known aortic aneurysm
13. Recent eye surgery or any condition with raised intracranial pressure (caused by forceful exhalation)
14. Undergoing allergen immunotherapy
15. Taking immune modulating agents including but not limited to: omalizumab, anti-IL-5, anti-IL4 /13 monoclonal antibodies over the past year
16. Other severe or uncontrolled atopic diseases including severe eczema, rhinitis and rhinoconjunctivitis
17. Pregnancy or breast-feeding
18. Unable to give consent
19. History of psychiatric illness, drug or alcohol abuse which may interfere in participation of the trial
20. Concomitant disease or condition that could interfere with, or for which the treatment of might interfere with the conduct of the study, or that would, in the opinion of the investigator, pose an unacceptable risk to the subject in this study
21. Unsuitability as defined by research doctor
22. Participation in any other ongoing clinical trial or research, except enrolment in ManARTS biobank

Date of first enrolment
07/10/2022

Date of final enrolment
01/05/2024

Locations

Countries of recruitment
United Kingdom

England

Study participating centre
Wythenshawe Hospital
Manchester University NHS Foundation Trust
Southmoor Road
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Sponsor information

Organisation
University of Manchester

ROR
https://ror.org/027m9bs27

Funder(s)

Funder type
Charity

Funder Name
The Jon Moulton Charity Trust

Results and Publications

Individual participant data (IPD) sharing plan

The datasets generated and/or analysed during this study will be included in the subsequent results publication.

IPD sharing plan summary

Other

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
HRA research summary			28/06/2023	No	No
Participant information sheet	version v1.0	04/02/2020	15/05/2020	No	Yes