Clinical Characterisation of study participants

All participants underwent measurements of peak flow (PEF), forced expiratory volume in 1 second (FEV1), forced expiratory capacity (FVC), assessment of bronchial hyperresponsiveness (histamine PC20), total IgE and skin prick tests (SPT) in addition asthmatics additionally had their reversibility (supplementary methods), asthma control questionnaire (ACQ) assessed and treatment with inhaled corticosteroids (ICS) or long acting beta agonists (LABA), number of exacerbations in the last year and number of courses of oral steroids required in the last year were also recorded. The clinical characteristics of some of these subjects have previously been described(1).

Measurements of lung function and airway hyperresponsiveness

Atopic individuals with a physician's diagnosis of asthma were diagnosed as asthmatics by bronchial hyperresponsiveness defined by a provocative concentration of histamine causing a 20% fall in FEV_1 (PC_{20}) <8 mg/mL or a greater than 15% reversibility of forced expiratory volume in 1 second (FEV_1) after 2.5mg nebulised salbutamol.

Spirometry was performed pre and post bronchodilator according to BTS/ARTP guidelines(2) using Micro medical Microlab medical spirometer with bacterial/viral filters (Spiroguard). Data recorded included FEV_1, FVC, PEF and FEV_1/FVC ratio. Airway challenge was performed with histamine according to ERS guidelines(3) using tidal breathing method. Normal subjects were required to have PC_{20} >16mg/mL histamine. Asthmatic subjects were asked to withhold long acting β agonists for up to 48h and/or short acting β agonists for up to 12h prior to testing. Asthmatic subjects completed an asthma control questionnaire (ACQ) to assess symptom control. Scores <0.5 indicate asthma is well controlled scores >1.5 = indicate asthma is not well controlled(4).

Skin prick testing

Atopy was diagnosed by skin prick testing to a panel of common aeroallergens (Modelo Harwell) including: house dust mite (Der P, component of Dermatophagoides pteronissinus),

Cladosporium herbarum, Alternaria alternata, Aspergillus fumigatus, 6 grass mix, house dust mite, Silver birch, 3 trees (Betula verrucosa, Alnus glutinosa, Corylus avellana), cat dander and dog hair. Allergen drops were placed on the clean forearm of the participant and introduced through the skin by an ALK sterile disposable lancet. A wheal 3mm greater than the control was considered diagnostic of atopy. Positive control (histamine) and negative control (normal saline) were also applied. Participants were asked to withhold any antihistamine medication for 3-5 days prior to this test.

Supplementary Table 1. Primer and probe sequences used.

18S Forward (300nM)	CGCCGCTAGAGGTGAAATTCT
18S Reverse (300nM)	CATTCTTGGCAAATGTCG
18S Probe	ACCGGCGCAAGACGGACCAGA
IFN-α(A) Forward (300nM)	CAGAGTCACCCATCTCAGCA
IFN-α(A) Reverse (900nM)	CACCACCAGGACCATCAGTA
IFN-α(A) Probe	ATCTGCAATATCTACGATGGCCTCGCC
IFN-α(B) Forward (300nM)	CTGGCACAAATGGGAAGAAT
IFN-α(B) Reverse (900nM)	CTTGAGCCTTCTGGAACTGG
IFN-α(B) Probe	TTTCTCCTGCCTGAAGGACAGACATGA
IFN-β Forward (300nM)	CGCCGCATTGACCATCTA
IFN-β Reverse (900nM)	GACATTAGCCAGGAGGTTCTCA
IFN-β Probe	TCAGACAACATTCATCTAGCACTGGCTGGA
IFN-λ1 Forward(300nM)	GGACGCCTTGGAAGAGTCACT
IFN-λ1 Reverse (900nM)	AGAAGCCTCAGGTCCCAATTC
IFN-λ1 Probe	AGTTGCAGCTCTCCTGTCTTCCCCG
IFN-λ2/3 Forward (300nM)	CTGCCACATAGCCCAGTTCA

IFN-λ2/3 Reverse (900nM)	AGAAGCGCATCTTCTAAGGCATCTT
IFN-λ2/3 Probe	TCTCCACAGGAGCTGCAGGCCTTTA

Virus preparation

RV16 and RV1B stocks previously used by the laboratory were expanded by passage through HeLa cell culture. 24h following rhinovirus innoculation flasks and contents were frozen at –80^{o}C for 1h then thawed. Freeze / thawing was repeated to fully disrupt cells. Virus was clarified by centrifuging 4000rpm for 15mins at 4ºC and sterility maintained through filtration through a 0.2 µm filter. This supernatant was used to infect further flasks of HeLa cells and the process repeated, generating the final volume of 650mL clarified and filtered HeLa cell supernatant containing RV16 or RV1B. RV serotype was confirmed with serotype specific anti-sera (American Type Culture Collection). Cells and virus stocks were tested for *Mycoplasma* using a commercially available detection kit according to manufacturer's instructions (Roche, Burgess Hill, UK).

Supplementary Results -Details of problems with HBEC culture

Initially HBECs were cultured exactly as described by Wark *et al* (5, 6). Problems experienced with HBEC culture are as follows: initially 10 HBEC samples failed to adhere or would adhere to flasks then die within 48 hours. Successful culture was then established using an altered protocol coating flasks overnight with a mixture of 1% BSA (Sigma Aldrich) solution supplemented with1:10 human collagen (Biovision) and 1:10 fibronectin (Roche) and leaving samples undisturbed for 48 hours. Cultures were also lost sporadically to contamination - a few within 24h of sampling, potentially due to contamination from the airway, but mainly after several weeks of culture (approximately 7 samples). Contamination occurred with various fungi and bacteria. This problem was tackled by

adding extra antibiotics to the culture medium; penicillin and streptomycin were added in addition to gentamicin and amphotericin already present.

The final issue with HBEC culture was that after successful HBEC culture had been established (success rate of ~90%) with the above modifications, for a period of several months every sample taken would die within 3-4 days after initially growing well. This was eventually determined to be due to a new incubator cleaning protocol involving addition of an antifungal detergent that had been added to the incubator water tray by a laboratory assistant without any of the investigators knowledge. When the antifungal was removed from the incubator, successful culture was then resumed. Approximately 10 samples were lost at this point and since the incubator issue was resolved the success rate again rose to >90%.

References

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