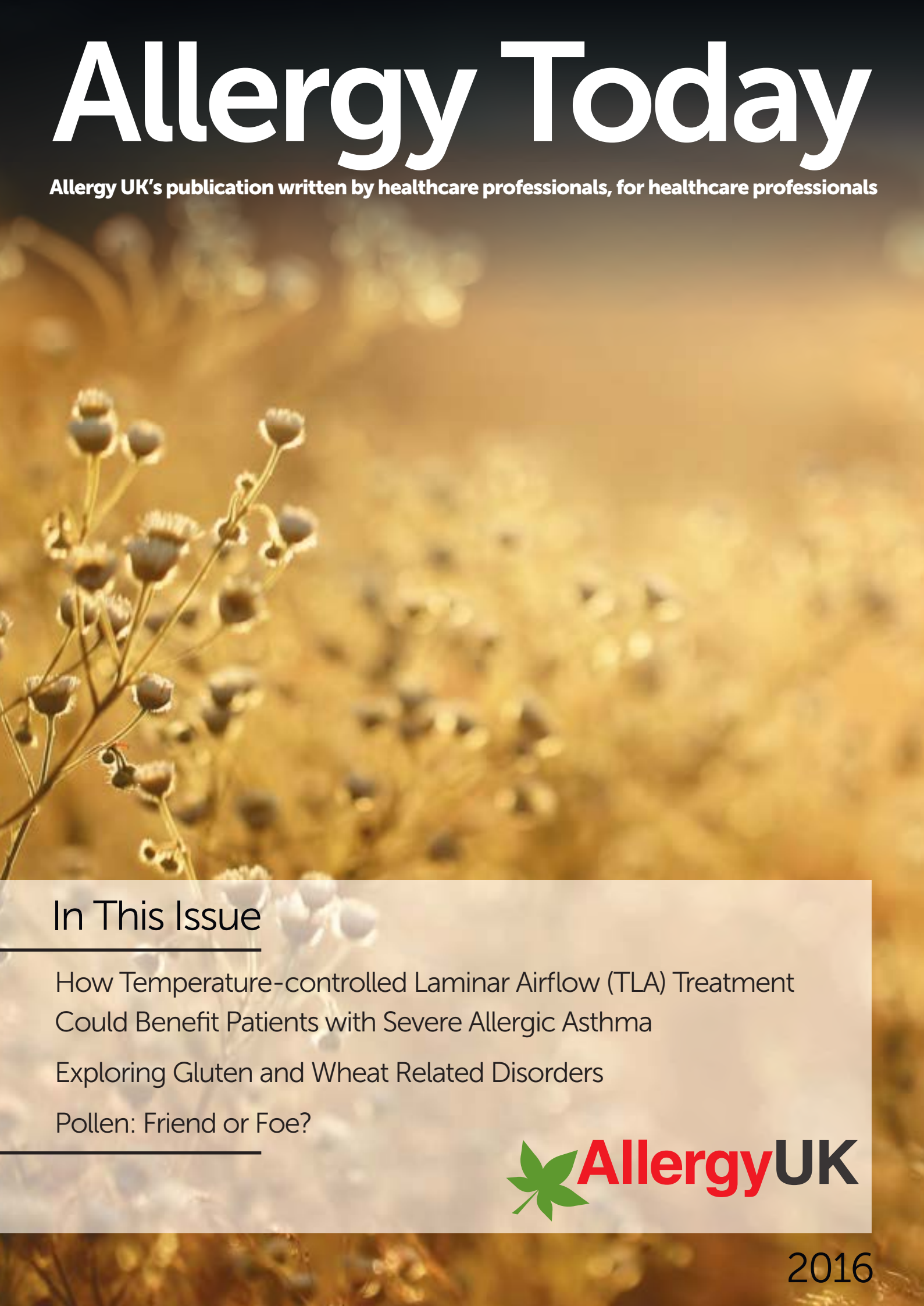
Allergy Today

Allergy UK's publication written by healthcare professionals, for healthcare professionals



In This Issue

AllergyUK

2016

Contents

Allergy UK is the leading national medical charity providing advice, information and support to people with allergies and food intolerance.

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Foreword

Welcome to the latest edition of Allergy Today. This issue illustrates what a dynamic field of medicine that Allergology has become. Traditionally, the cornerstone of the management of any allergy was simple avoidance. Although sometimes effective this could have enormous implications for quality of life, for example with food allergies, whilst with allergy to environmental triggers, avoidance can be wholly impractical. However, innovations in the area are starting to change the way we do things. Temperature-controlled Laminar Airflow (TLA) devices are already showing their effectiveness in the treatment of asthma, where environmental allergy plays a part and are making allergen avoidance a more practical reality. Allergen desensitisation is another innovative approach, where deliberate exposure can change the way our body responds and significantly lessen the effect of an allergen. Sadly, there is still a lot of work to do in not just refining these treatments but also in convincing the National Health Service to make them accessible to everybody who could benefit.

Another area of intense interest is that of gluten and wheat. It is not long since we completely failed to recognise the many different ways that our bodies could react to wheat. Coeliac disease was significantly underestimated in its prevalence and many people suffered unknowingly, long into adult life. There was also a failure to recognise that those who did not quite fit the label of coeliac disease could also still be reacting. Fortunately, our awareness in this area is improving and provides another example to doctors of how important it is to listen to our patients rather than trying to fit them into the diagnostic boxes we create and dismiss them if they don't!

I hope that this issue gives you some insight into the important changes that are happening in the field and that you share my optimism for a better future for allergy sufferers.

Dr Adam Fox

Dr Adam Fox, Chairman of Allergy UK Health Advisory Board;
Consultant Paediatric Allergist (St Thomas' Hospital) and Reader in Paediatric Allergy (King's College London)

FOREWORD

Welcome

Allergy UK is a lifeline to those living with allergic conditions and to their families. Our dedicated helpline, web chat and website continue to offer invaluable support throughout the allergic patient's journey, enabling them to manage their condition and receive appropriate diagnosis and treatment.

We are increasing our work with healthcare professionals to ensure you feel supported in your role in diagnosing, treating and managing allergic patients. In 2015, we launched a series of masterclasses for healthcare professionals including doctors, nurses and health visitors. We are continuing to build on this success by holding a further six masterclasses in 2016 with renowned experts in the world of allergy speaking at our events.

Providing education to a wider audience is an integral part of our mission as a charity. With your support, we can make a real difference to the lives of those with allergies and intolerances.

Carla Jones

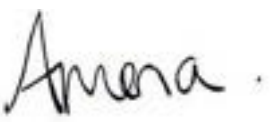
CEO, Allergy UK

Allergy UK has been actively engaged in many projects that are making a national difference to dealing with issues around allergy. As the numbers of cases of food allergy continues to increase, and with recent research showing a 615 per cent increase in UK hospitalisations for anaphylaxis[1], these types of projects are of vital importance.

Allergy UK's website continues to be a valuable resource to those seeking allergy information, from downloading one of our 140 factsheets to finding out about products that may help allergic individuals in their everyday lives.

As new scientific and research-based evidence emerges in allergy, we update our factsheets to make them as factually correct as we can with the current knowledge and information available. All of our factsheets carry the Information Standard accreditation.

I hope you will enjoy reading this edition and the information you gain can help influence your practice in dealing with patients with allergy



Amena Warner

Head of Clinical Services, Allergy UK

[1] Turner et al, JACI 2015

WELCOME

Allergy News

Increasing Allergy Awareness in Schools

Allergy UK has been involved in a collaborative schools project, centered on best practice by using policy and procedures, to make allergic children as healthy and safe as possible using a whole school allergy awareness approach. There is an area on Allergy UK's website specifically dedicated to schools for teachers, school governors, catering/dinner staff, school nurses, parents and pupils to access, although the whole toolkit is currently work in progress, so keep returning to this section for further updated information and resources.

This should result in:

1. Guidance in form of a framework to manage allergy in the school environment
2. Engaging the school parents and children in decision making
3. Management of medicines in schools (new policy document has just been updated)
4. Reduced risk of cross contamination where meals are provided.

The Leap (Learn Early About Peanut) Study

The LEAP study was published in 2015. Given its severe nature and the absence of a cure, prevention remains our best hope to reduce peanut allergy in children. But how exactly can peanut allergy be prevented? Does eating peanuts during infancy make the immune system tolerant, or sensitive, to peanuts consumed later on? Does one approach work better than the other in preventing peanut allergy in children? These are the important questions the LEAP study seeks to answer. The study found there is an early opportunity for inducing tolerance to peanut and therefore prevent peanut allergy. This is such an important finding as we try to reduce the increasing numbers of peanut allergic children.

The consensus communication on Early Peanut Introduction and the Prevention of Peanut Allergy in High-risk infants', published in September 2015, recommends early introduction of peanut into the diets of children at high risk of developing peanut allergy. Although these high risk infants will need first to be assessed by an allergist, have diagnostic test and possibly challenged under supervision (risk factors include severe atopic dermatitis and those with allergy to egg). Refer to http://pediatrics.aappublications.org/content/136/3/600 for further guidance. Smooth peanut butter or Bamba (a peanut coated soft snack) can be used. This should be done before the first year of life, usually early on with weaning (whole nuts should never be used in children under five due to the risk of choking).

Rationale for Evaluating and Applying this Policy to a High-risk Population

The LEAP study demonstrates that early peanut introduction can be successfully carried out in a high-risk population (such as the population defined in the LEAP trial e.g. (1) severe eczema, (2) egg allergy). However, without intervention by healthcare providers, there is the potential that such high-risk infants will remain at risk - experiencing a delayed introduction of solids and allergenic foods into their diet due to the widespread belief that such foods may exacerbate eczema.

More extensive guidelines will be forthcoming from stakeholder groups such as EAACI (European Academy of Allergy and Clinical Immunology). These groups will consider all of the available data and determine whether there is sufficient evidence to apply prevention strategies to the general population. However, engagement of the primary care, allergy and dermatology communities to rapidly implement these findings and change the culture of early feeding practices is essential. The forthcoming Working Group's and EAACI Guidelines Group's documents will better clarify a best-practice approach.

TLA Treatment for Patients with Severe Allergic Asthma

Professor Anoop J Chauhan

Professor of Respiratory Medicine and Director of Research and Innovation at Portsmouth Hospitals NHS Trust. Professor Chauhan is Chief Investigator for the LASER Trial.

Dr Tom Brown

Consultant Respiratory Physician at Portsmouth Hospitals NHS Trust.

Dr Will Storrar

LASER Trial Coordinator and a Wessex Respiratory Specialty Trainee.

FEATURE

Asthma affects over 5.4 million people in the UK with nearly 500,000 experiencing severe symptoms and frequent exacerbations that are inadequately controlled with available treatments[1,2]. The burden of severe asthma on the NHS is enormous accounting for 80 per cent of total asthma cost (£1 billion[3]), with frequent exacerbations and expensive medications generating much of this cost[4].

More than 70 per cent of severe asthmatic patients are sensitised to common aeroallergens and/or moulds[5], and high exposure in sensitised individuals is associated with a higher symptom burden and asthma related morbidity including exacerbations and hospital admissions[6,7,8,9]. Domestic exposure to allergens is also known to act synergistically with viruses in sensitised patients to increase the risk and severity of exacerbations[10]. Allergen avoidance has been widely recognised as a logical way of treating these patients[11]. In controlled conditions, long-term allergen avoidance in sensitised asthmatics reduces airway inflammation with consequent symptomatic improvement, further supported by high-altitude, clean-air studies[12,13,14]. Unfortunately, effective methods of allergen reduction have proved elusive[15,16] with current measures unable to reduce allergen load sufficiently to yield a consistent clinical improvement, thus leaving a significant gap in the potential strategies for reducing asthma severity through allergen reduction.

Temperature Controlled Laminar Airflow (TLA) Therapy

At night, airborne particles are carried by a persistent convection current established by the warm body, transporting allergens from the bedding area to the breathing zone[17]. Proof-of-concept studies have shown that TLA can reduce the total number of airborne particles >0.5µm in the breathing zone by 3000-fold ($p<0.001$), cat allergen exposure by 7-fold ($p=0.043$) and significantly reduces the increase in particles generated when turning in bed for all particle sizes [18]. When compared to a best in class traditional air cleaner TLA is able to reduce exposure to potential allergens by a further 99% [18].We postulate this highly significant reduction in nocturnal exposure, targeted to the breathing zone, explains why TLA may succeed in an area where so many other measures, including air filters, have failed.

> At night, airborne particles are carried by a persistent convection current established by the warm body, transporting allergens from the bedding area to the breathing zone

Evidence of Benefit with TLA Therapy

The TLA device when compared to placebo, has proven efficacy on asthma-related quality of life and bronchial inflammation (measured by exhaled nitric oxide) in a pan European multicentre Phase III study[19], (n=282, age range 7-70 years). The greatest benefit was seen in the more severe asthma patients requiring higher intensity treatment (GINA Steps 4-5) and in patients with poorly controlled asthma (Asthma Control Test <19). Whilst not powered to ascertain an effect on exacerbations, a post-hoc analysis showed a decreased exacerbation rate in more severe patients treated with TLA when compared with placebo with a trend towards significance (mean 0.23 TLA; 0.57 placebo p=0.07).

In a further crossover trial of 22 patients [20], treatment with the TLA device was associated with a significant improvement in mini-AQLQ score compared with placebo (mean score change 0.54; p<0.05, n=20). Significantly lower values of exhaled nitric oxide were also detected during the active treatment period (mean –6.95 ppb; p<0.05, n=22.)

A prospective study of 30 German children[21] and adults with poorly controlled asthma comparing the year before and after introduction of the Airsonett device showed a reduction in the annual rate of exacerbations (3.57 before, 1.30 after. n=30; p=0.00013), a reduction in the number of patients needing at least one emergency or unplanned clinic visit (76% before, 33% after, n=21; p=0.0126), a reduction in number of hospitalisations (32% before, 14% after, n=22; p=0.102) and reduced bronchial hyper-reactivity (70% of patients before and 30% after, n=27; p=0.0045). Both doctors and patients evaluation of their asthma control was improved after treatment.

> Asthma affects over 5.4 million people in the UK with nearly 500,000 experiencing severe symptoms

The LASER Trial

In order to determine whether the TLA device is able to reduce the frequency of severe exacerbations in patients with severe allergic asthma, a randomised, double-blind, placebo controlled trial is required.

The LASER Trial, Laminar Airflow in Severe asthma for Exacerbation Reduction, is a multicentre trial (ISRCTN46346208) currently recruiting patients to sites across the UK. The trial is sponsored by Portsmouth Hospitals NHS Trust and is being funded by the National Institute for Health Research Health Technology Assessment Programme (Project Number 12/33/28).

The trial is recruiting patients aged 18-75 who have severe asthma (requirement for >1000 BDP equivalent inhaled corticosteroid + an additional reliever medication and/or requirement for oral corticosteroids) and who are allergic to a perennial indoor aeroallergen (Cat/Dog/House Dust Mite/Moulds). Participants are required to have uncontrolled asthma with two or more asthma attacks requiring treatment with systemic corticosteroids within the preceding 12 months and an asthma control questionnaire (ACQ) score of >1.0.

The primary outcome for the trial is the frequency of severe exacerbations during a 12 month follow up period. Results will also be analysed to look at the effect of treatment on asthma control, asthma and generic quality of life. A health economics analysis will also be performed to look at cost effectiveness of the treatment device. Qualitative interviews will elicit participant's perceptions, values and opinions of the treatment device.

Conclusions

It is hoped this RCT will show whether TLA treatment might offer a much needed new treatment option to patients with severe allergic asthma, a patient group who currently have limited treatment options and represent a significant unmet need.

For further information about The LASER Trial, please contact Dr Will Storrar, The LASER Trial co-ordinator: T 07730 619850 E: william.storrar@porthosp.nhs.uk or visit the trial website www.lasertrial.co.uk. **Patients can be directed to the trial website to register their interest in the trial.**

References

1. Asthma UK. Living on a Knife Edge. A powerful and moving account of living with serious symptoms of asthma. 2004

2. Holgate ST and Polosa R. The mechanisms, diagnosis and management of severe asthma in adults. Lancet. 2006;368:780-93

3. http://www.asthma.org.uk/news-centre/facts-for-journalists/

4. Hoskins G, McCowan C, Neville RG, Thomas GE, Smith B and Silverman S. 'Risk factors and costs associated with an asthma attack', Thorax. 2000;55:19–24

5. Heaney LG, Brightling CE, Menzies-Gow A, Stevenson M, Niven RM; British Thoracic Society Difficult Asthma Network. Refractory asthma in the UK: cross-sectional findings from a UK multicentre registry. Thorax. 2010;65:787-794

6. Custovic A, Taggart SC, Francis HC, Chapman MD and Woodcock A. Exposure to house dust mite allergens and the clinical activity of asthma. J Allergy Clin Immunol. 1996;98(1):64-72

7. Tunnicliffe WS, Fletcher TJ, Hammond K, Roberts K, Custovic A, Simpson A et al. Sensitivity and exposure to indoor allergens in adults with differing asthma severity. Eur Respir J. 1999;13:654-659

8. Langley SJ, Goldthorpe S, Craven M, Morris J, Woodcock A and Custovic A. Exposure and sensitisation to indoor allergens: Association with lung function, bronchial reactivity and exhaled nitric oxide measures in asthma. J Allergy Clin Immunol. 2003;112(2):362-368

9. Rosenstreich DL, Eggleston P, Kattan M, Baker D, Slavin RG, Gergen P et al. The role of cockroach allergy and exposure to cockroach allergen in causing morbidity among inner-city children with asthma. NEJM. 1997;336:1356-63

10. Green RM, Custovic A, Sanderson G, Hunter J, Johnston SL and Woodcock A. Synergism between allergens and viruses and risk of hospital admission with asthma. Case-control study. BMJ. 2002;324:763

11. Custovic A. Simpson A, Chapman MD and Woodcock A. Allergen avoidance in the treatment of asthma and atopic disorders. Thorax. 1998;53:63-72

12. Van Velzen E, van den Bos JW, Benckhuijsen JA, van Essel T, de Bruijn R and Aalbers R. Effect of allergen avoidance at high altitude on direct and indirect bronchial hyperresponsiveness and markers of inflammation inchildren with allergic asthma. Thorax. 1996;51:582-584

13. Peroni DG, Boner AL, Vallone G, Antolini I, and Warner JO. Effective allergen avoidance at high altitude reduces allergen-induced hyperresponsiveness. Am J Respir Crit Care Med. 1994;149:1442–6

14. Grootendorst DC, Dahlén SE, Van Den Bos JW, Duiverman EJ, Veselic-Charvat M, Vrijlandt EJ,et al. Benefits of high altitude allergen avoidance in atopic adolescents with moderate to severe asthma over and above treatment with high dose inhaled steroids. Clin Exp Allergy. 2001;31:400-8

15. Gotzsche PC and Johansen HK. House Dust Mite Control Measures for Asthma. Cochrane Database of Systematic Reviews 2008

16. Sublett JL. Effectiveness of air filters and air cleaners in allergic respiratory diseases: a review of the recent literature. Curr Allergy Asthma Rep. 2011;11:395–402

17. Sigsgaard, T., Temperature regulated Laminair Airflow (TLA): TLA principles and practise, presented at European Academy of Allergy and Clinical Immunology 2010 Congress, London

18. Gore RB, Boyle RJ, Hanna H, Custovic A, Gore C, Svensson P, et al. Personal allergen exposures are increased by changes in sleep position and improved by temperature controlled laminar airflow. Thorax. 2010;65:A87-A88

19. Boyle RJ, Pedroletti C, Wickman M, Bjermer L, Valovirta E, Dahl R et al. Nocturnal Temperature Controlled Laminar Airflow for Treating Atopic Asthma: a randomised controlled trial. Thorax 2012;65:215-221

20. Pedroletti C., Millinger E., Dahlen B., Soderman P. and Zetterstrom O. Clinical effects of purified air administered to the breathing zone in allergic asthma: A double-blind randomized cross-over trial. Respiratory Medicine 2009; 103: 1313-1319

21. Schauer U, Bergmann K-C, Gerstlauer M, Lehmann S, Gappa M, Brenneken A et al. Improved asthma control in patients with severe, persistent allergic asthma after 12 months of nightly temperature-controlled laminar airflow: an observational study with retrospective comparisons. European Clinical Respiratory Journal. 2015; 2: 28531

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Allergic Rhinitis and Specific Immunotherapy

Allergy Profile

Dr Katherine Anagnostou

MD (Hons) MRCPCH MSc PhD

Dr Katherine Anagnostou is currently completing her specialist allergy training at St Thomas' Hospital in London. She has worked in paediatric allergy for the last six years and has developed a special interest in the use of immunotherapy, as a form of active treatment for allergic disorders. Katherine was awarded her PhD from Cambridge University, focusing on a trial of peanut oral immunotherapy in children, which attracted a lot of media interest all over the world. Her main research findings were recently published in the medical journal, The Lancet.

FEATURE

Allergic rhinitis (AR) is common in the UK and health surveys suggest that its prevalence is increasing in children of all ages, as well as adults, affecting 10-20% of the population. According to the International Study of Asthma and Allergies in Childhood (ISAAC), 10.1% of children aged 6-7 years and 15.3% of those aged 13-14 years, report symptoms of allergic rhino-conjunctivitis in the past 12 months[1].

The most common symptom of chronic AR is a blocked nose, but clear nasal discharge, sneezing and itchy eyes are also often reported by patients. Symptoms present following exposure to the relevant aero-allergen (grass or tree pollen, weeds, fungi, moulds, house dust mites, animal dander). 'Seasonal' AR occurs when levels of allergens are elevated, for example, tree pollen allergic subjects are likely to experience AR exacerbations throughout the spring, whereas those affected by grass pollen allergy may find their symptoms increasing over the summer months. In contrast, the symptoms of 'perennial' AR (for example house dust mite) are more troublesome in the winter, as sufferers are likely to spend more time indoors [1].

The proportion of patients consulting their GPs for allergic rhinitis has more than doubled and the numbers of community prescriptions for drugs used in nasal allergy, in all age groups, have risen steadily over the last 20 years [2]. The burden of allergic rhinitis is often under-appreciated, despite the fact that it results in a significant reduction of the quality of life of sufferers. Patients experience disruption to their daily life, both at work and during leisure activities. Rhinitis symptoms often have an impact on sleep, with consequent tiredness, irritability, headaches and poor concentration. It has been shown that children with allergic rhinitis perform significantly worse than peers in summer examinations when compared to their mocks. In fact, young people with reported allergic rhinitis symptoms on an examination day, are 40% more likely to drop a grade between their practice and final GCSE examinations[3].

The Allergic Rhinitis and its Impact upon Asthma (ARIA) Guidelines propose a stepwise approach to the management of AR[4]. Allergen avoidance and the regular use of a non-sedative antihistamine (second or third generation) constitute the first management step. Continued symptoms can be treated with a regular intranasal steroid spray. Parents often express concerns regarding this, but reassurance should be given that long-term follow-up studies with steroid nasal sprays have shown no impact on growth in childhood. Decongestants are known to cause vasoconstriction of the nasal blood vessels thereby decreasing nasal congestion. However, their use should be limited to 3-5 days at a time due to the rebound congestion effect ('rhinitis medicamentosa'), which follows longer regular use. An eye drop preparation can be used for symptoms of conjunctivitis. Anti-leukotrienes (i.e. montelukast) may be considered for both adults and children with seasonal AR and also for preschool children with persistent allergic rhinitis, according to the ARIA guidelines. For patients suffering from concomitant asthma, it has been suggested that appropriate AR management may also improve asthma outcomes [4].

It is important to involve secondary care in all cases, where the use of a nasal steroid spray does not result in sufficient relief and particularly in cases of co-morbid allergic disease.

Immunotherapy for Allergic Rhinitis

The practice of administering gradually increasing doses of allergen extract in order to reduce the symptoms associated with subsequent exposure dates back to 1911. Formulations for grass pollen, tree pollen and most recently dust mite allergen are currently available for use in the UK.

Subcutaneous immunotherapy (SCIT) consists of the administration of a number of subcutaneous injections, over a few weeks, on three subsequent years. Various studies have demonstrated its efficacy in reducing symptoms and/or the need for medication for AR, both in adults and children. Most importantly SCIT not only induces long-term remission, but it may also prevent the development of new sensitisations. It has also been shown to reduce the progression of disease from allergic rhinitis to allergic asthma. Systemic reactions with SCIT have been reported in 0.1-3.3% of injections and 2-5.5% of patients[5]. It is generally considered a safe treatment, provided recommendations to minimise and manage adverse reactions are followed.

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> According to the International Study of Asthma and Allergies in Childhood (ISAAC), 10.1% of children aged 6-7 years and 15.3% of those aged 13-14 years, report symptoms of allergic rhino-conjunctivitis in the past 12 months

Sublingual immunotherapy (SLIT) is a relatively new development that has shown good efficacy and an excellent safety profile. SLIT is usually well tolerated with only mild adverse reactions reported from patients (oral itching or swelling, nausea, stomach ache), which are mostly self-resolving. The sublingual route only requires the first dose to be supervised, as all subsequent doses are administered by the patient, at home. However, this reliance on patient administration does raise the issue of adherence, which is likely to influence efficacy[6]. Studies have shown significant cost benefits in both children and adults who underwent immunotherapy for allergic rhinitis[7].

At present, immunotherapy is restricted to specialist clinics. It is important to consider the long-term benefits of immunotherapy (better quality of life, disease-modifying treatment, reduced overall cost) for those patients who do not respond adequately to pharmacotherapy.

References

1. Beasley, R. & others. Worldwide variation in prevalence of symptoms of asthma, allergic rhinoconjunctivitis, and atopic eczema: ISAAC. Lancet 351, 1225–1232 (1998).

2. Gupta, R., Sheikh, a, Strachan, D. P. & Anderson, H. R. Burden of allergic disease in the UK: secondary analyses of national databases. Clin. Exp. Allergy 34, 520–6 (2004).

3. Walker, S. et al. Seasonal allergic rhinitis is associated with a detrimental effect on examination performance in United Kingdom teenagers: case-control study. J. Allergy Clin. Immunol. 120, 381–7 (2007).

4. Brozek, J. L. et al. Allergic Rhinitis and its Impact on Asthma (ARIA) guidelines: 2010 revision. J. Allergy Clin. Immunol. 126, 466–76 (2010).

5. Passalacqua, G. & Durham, S. R. Allergic rhinitis and its impact on asthma update: allergen immunotherapy. J. Allergy Clin. Immunol. 119, 881–91 (2007).

6. Wilson, D. R., Lima, M. T. & Durham, S. R. Sublingual immunotherapy for allergic rhinitis: systematic review and meta-analysis. Allergy 60, 4–12 (2005).

7. Hankin, C. S., Cox, L., Bronstone, A. & Wang, Z. Allergy immunotherapy: Reduced health care costs in adults and children with allergic rhinitis. J. Allergy Clin. Immunol. 131, 1084–1091 (2014).

Pollen: Friend or Foe?

The incidence of allergy is increasing at an alarming rate especially in urban areas (D'Amato et al, 2013). There are several reasons for this, one of the most potent and troublesome triggers being pollen. The most common allergenic pollens are derived from grass and trees. This article will focus on trees, through which the key positive and negative impacts of pollen in the modern metropolis will be explained. It highlights significant research papers and projects, and outlines the basis of sustainable solutions for safer and healthier public and private outdoor space, through inter-professional collaboration and 'designing out' allergy by judicious planting and landscaping.

Pollen Positive

The world needs pollen and industrious pollinating insects, particularly bees, which help to restore the imbalance of monocultures and concrete jungles. Biodiversity of both flora and fauna is critical to safeguarding the planet. Getting the right mix of plants, from majestic urban trees to delightful nectar-rich flowers, is critical in the creation of outdoor spaces for healthy living. The benefits are extensive, as minimising allergenic pollens alleviates symptoms in individuals, with significant impact on educational attainment (Muraro et al, 2010) and thence the productivity and wealth of nations. The right pollens in the right place is an undervalued asset.

Characteristics of Pollen

Pollen grains carry male gametes (i.e. male DNA) to the female parts of a flower. Pollen requires both resilience and assistance to protect the gametes on their journey and reach their goal. Airborne pollen (anemophilous) is particularly light, fine and produced in huge amounts, while pollen dispersed by insects (entomophilous) is less likely to cause allergy because it is usually heavier, stickier and produced in smaller quantities. Examples of species producing airborne pollen include birch, alder, ash, plane and lime – familiar in many streetscapes.

Birch trees monoculture

Allergy Profile

Shenagh Hume

Shenagh Hume brings over 20 years' experience as a registered nurse specialising in asthma and allergy. For five years she coordinated the adult immunotherapy clinic at Guy's and St Thomas Hospital, London. Shenagh graduated in Garden Design from Capel Manor and now uses her unique experience to advise on allergies in gardens and public spaces. Shenagh has a passion for planting to create healthy outdoor spaces and her aim is to 'design out' triggers such as airborne allergens, particularly those associated with exacerbating respiratory conditions.

FEATURE

Oak catkins

Sexism in Plants

There are three primary classifications of flowering plant: perfect, monoecious and dioecious. Perfect-flowered plants (sometimes referred to as bisexual or hermaphrodite) have male and female parts in the same flower. Monoecious plants have separate (unisexual) male and female flowers, both growing on the same plant; not all are allergenic, but many are wind-pollinated. Dioecious plants are separate-sexed; each separate plant is either male or female. Males produce pollen, which makes them highly allergenic, while females produce seeds or fruit and no pollen. For commercial reasons the horticultural industry clones most trees and shrubs asexually. In the case of dioecious species the male selections outnumber the female ones.

Local authorities in their street planting schemes often favour male cultivars because they cause less litter than female trees, which drop their fruit and make a mess on the pavement. This sexist approach helps to economise on street cleaning maintenance and to mitigate against slip and trip hazards. The effect in many towns and cities has been to reduce biodiversity, and this is accentuated by the aesthetic preferences of many landscape architects for formality and symmetry, in planting a single cultivar (monoculture) in grids. The impact on health is often greater exposure to pollen and an increase in resultant allergies.

More Felt Than Seen

It is worth noting that pollen in the air is virtually invisible. Allergic reactions to it can be immediate with symptoms such as sneezing. However, the response is often delayed and persistent, resulting in ongoing inflammation. Fine airborne pollen may be carried in the hair or clothes of a sufferer, who may be unaware of the exposure and therefore not link their cold-like symptoms to the plant source. Moreover, sniffles may occur earlier than expected; the pollen calendar demonstrates that airborne pollen from one tree species or another is present from January until August, and grass pollen throughout the summer.

Closing the Data Gap

The National Pollen and Aerobiology Research Unit at the University of Worcester is the exception to the rule in capturing pollen data throughout the year (NPARU website). Across the UK most pollen counts and media-reporting takes place between mid-March and late August. This corresponds to the months when the public at large expect hay fever to occur, and may influence the popular opinion that it is showy, colourful herbaceous flowers that are responsible for triggering spring and summer allergies. In fact, for the most part, this is a myth. The high visibility of these flowers attracts bees and other beneficial garden insects – good news for biodiversity as well as human health, because insect-pollinated flowering plants are invariably low allergen.

But what about the link between pollen and poor air quality caused by traffic pollution? Internationally, a number of scientists are currently investigating the potential for air pollution to increase the allergenicity of pollens. In March 2015, Science Daily reported on the Max Planck Institute research findings presented to the 249th National Meeting & Exposition of the American Chemical Society. A pair of air pollutants linked to climate change - nitrogen dioxide and ground-level ozone - could also be major contributors to the unparalleled rise in the number of people sneezing, sniffling and wheezing during allergy season. These two gases appear to provoke a chain of chemical reactions that may increase the potency of certain airborne allergens (American Chemical Society, 2015).

Nitrogen dioxide has been implicated in recent media coverage of diesel-powered vehicle emissions, issuing wider public awareness of the harm to health caused by poor air quality, especially in urban areas. However, the link to airborne pollens has not yet been recognised beyond specialist aerobiological research labs and academic papers.

All too often the presence of allergic triggers such as pollen is not appreciated or taken into account when planning and designing both public and private landscapes. European Aerobiology Society (EAS) President Dr. Michel Thibaudon has said: "Highly

allergenic trees are planted close to people's houses and schools, because pollen emissions and their interaction with human activities are not taken into account when planning. We need to systematically collect this data to take informed decisions to protect our health from pollen emissions" (Thibaudon, 2015). The results may help to close the pollen data gap and consequently raise awareness of how some street trees can both filter toxic pollution and generate a potent cocktail of airborne pollens.

Birch: Friend and Foe

The planting of trees in urban areas has increased in the past few years, as green spaces are proven to be more pleasant to live in, reduce crime, mitigate against global warming, attenuate storm water and filter carbon emissions. Silver birch is an attractive tree with wonderful bark and foliage that casts dappled light and is resilient to traffic pollution. Birch is now a common sight in city hardscapes where its fine pollen cannot be absorbed into soft surfaces and, instead, flies about invisibly. In allergy terms, birch pollen is particularly problematic due to the 'birch oral allergy syndrome' that links it to food allergies.

The case study (see page 16) of silver birch newly introduced to Christchurch New Zealand, is a useful benchmark. It demonstrates two critical factors contributing to the allergenic potential of a planted environment: proximity pollinosis and monoculture. It is worth noting that birch has a biennial trend of pollen production with alternating years of high and low catch.

Sustainable Solutions for Health

By adding people to the Right Plant Right Place principle of sustainable horticulture, it is possible to reduce exposure to pollens with judicious placement and combinations of species. To this effect, the Ogren Plant Allergy Scale (Ogren, 2015) that indicates the allergenicity of a plant on a 1-10 scale, is a very useful tool. Planting alone will not ameliorate the landscape, but it can help. Designer of child-friendly gardens Jackie Herald advocates that: "a healthy and happy landscape is also about spatial flow and the appropriate density of low pollen planting, with a good balance of hard and soft surfaces. There's such a wide choice of materials and planting options, it's always possible to create a low allergen garden with plenty of WOW factor!". She considers the allergy question to be integral to best practice; it is high on her standard list of criteria to establish the client's design brief. Yet, more often than not, landscape architects' and garden designers' primary influence is aesthetic, the silver birch being a perennial favourite.

Guidelines for designing spaces with low allergy impact (Carinanos and Casares-Porcel, 2011), developed jointly by botanists and pharmacists at the University of Granada, Spain, include the following critical factors:

- Increase plant biodiversity
- Avoid massive use of male individuals of dioecious species
- Choose species with low-to-moderate pollen production
- Adopt appropriate management, maintenance and gardening strategies to ensure removal of opportunist and spontaneous species
- Avoid forming large focal pollen sources and screens by respecting planting distances
- Obtain expert advice when selecting suitable species for each green area, and avoid fostering cross-reactivity between panallergens.

Conclusions

Similarly to humans, trees behave differently in a city environment than when they are in a less regimented 'natural' setting in the countryside. Statistically the incidence of allergy is much less in rural areas than in urban zones. An MDT approach in both research and professional practice is required to ensure healthier environments to live in. This includes allergists and doctors, botanists and landscape designers, town planners and educationalists, and well informed politicians with a will to generate holistic change.

Willow catkins

Birch catkins

Case Study: Birch Allergy in New Zealand

American allergy-fighting horticulturalist Thomas Leo Ogren (Allergy-free Gardening, 2015) was contacted by a doctor in Christchurch, New Zealand, who was very concerned about the trees recently planted at the primary school his daughter, then age nine, attended. She was suffering from both pollen allergies and allergic-asthma. Just prior to this, the press had devoted many column inches to the thousands of non-native silver birch trees that lined streets of Christchurch, and to the terrible pollen-allergies these same trees caused so many people each spring. The birch planting had been continued directly through the school playground. The doctor requested that the local authority remove the birch trees and replace them with low-pollen trees. When his request was denied he took the authority to court. In the process Ogren had to submit an expert testimony. Ogren acknowledged that birch trees are beautiful, but explained that they don't belong in schoolyards. Trees are important, but children are more important. He advised the birches be removed and immediately replaced with pollen-free trees, using the largest feasible specimens. The court found in the doctor's favour; the silver birches were replaced with good-sized red maple 'Autumn Glory', which is a female, pollen-free cultivar valued for its brilliant display of autumn colour, and already known to thrive in Christchurch. Today, these maples are mature and provide much-needed shade at the school. Best of all, the children are no longer exposed each spring to a bombardment of allergenic birch pollen in their playground.

References

Allergy-free Gardening, 2015. Allergy-free school yards. Available at: http://www.allergyfree-gardening.com/articles/50-allergy-free-school-yards.html [accessed 18 October 2015]

American Chemical Society, 2015. Air pollutants could boost potency of common airborne allergens. Science Daily, 22 March 2015. Available at: www.sciendedaily.com/releases/2015/03/150322080208.htm

Carinanos, P. and Casares-Porcel, M., 2011. Urban green zones and related pollen allergy: A review. Some guidelines for designing spaces with low allergy impact. Landscape and Urban Planning, 101:205–214

D'Amato, G. et al, 2013. Climate change, air pollution and extreme events leading to increasing prevalence of allergic respiratory diseases. Multidisciplinary Respiratory Medicine, 8:12

ISAAC (The International Study of Asthma and Allergies in Childhood) Steering Committee), 1998. Worldwide variation in prevalence of symptoms of asthma, rhinoconjunctivitis, and atopic eczema. Lancet:1225-32

Muraro, A. et al, 2010. The management of the allergic child at school: EAACI/GA2LEN Task Force on the allergic child at school. Allergy 65: 681–689

NPARU website http://www.worcester.ac.uk/discover/pollen-forecast.html

Ogren,T.L., 2015. The Allergy Fighting Garden. Berkeley: Ten Speed Press

Thibaudon, M., 2015. Quoted in More Europeans will be allergic to pollen if no measure is taken to reduce exposure. Press release available at: http://www.efanet.org/images/2015/EAACI_-_EAS_-_EFA_-_IRS_Joint_PR_-_International_Ragweed_Day_20150627.pdf

Gluten Related and Wheat Disorders

The market for gluten and wheat free products has boomed in recent years due to gluten being implicated in a wide range of symptoms. This article briefly discusses current knowledge of gluten and wheat related disorders.

The proteins that make up gluten are prolamins and are known as gliadins in wheat, secalins in rye hordeins in barley and avenins in oats[1]. In wheat it is these main structural components along with equal amounts of glutenins that provide the elasticity required when water is added for making staple foods such as breads and pastas. Wheat is consumed worldwide and is now replacing rice as the staple in countries in North Africa, the Middle East and Asia[2]. Wheat only became part of the human diet around 10,000 years ago[3] and most of the wheat products consumed today are produced from varieties bred since the 1970s[4]. Current varieties contain more gluten than in the past and modern bakery goods contain a higher amount of gluten due to reduced fermentation time[2]. Gliadins have been identified as the main toxic component of gluten[5].

Symptoms vary according to the mechanism and the specific proteins recognised. For example, in immunoglobulin E (IgE) mediated wheat allergy (WA), a range of proteins including α-, β-, γ- and ω-gliadins and low and high molecular weight subunits may trigger release of histamine from basophils and mast cells causing respiratory, skin and gastro-intestinal symptoms[6]. All patients with anaphylaxis or wheat dependent exercise induced anaphylaxis (WDEIA) and 55 per cent with urticaria produce IgE to ω-gliadins[6]. Baker's asthma and rhinitis are also allergic responses to wheat and cereal flours via inhalation and here other proteins such as α-amylase inhibitors, germ agglutinins and lipid transfer proteins are involved[1]. Diagnosis is made by skin prick tests and specific IgE assays; although the positive predictive value of these tests is less than 75 per cent, especially in adults due to the cross reactivity with grass pollens[6].

Allergy Profile

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FEATURE

> Wheat only became part of the human diet around 10,000 years ago. Current varieties contain more gluten than in the past and modern bakery goods contain a higher amount of gluten due to reduced fermentation time

Coeliac disease (CD) is an autoimmune disorder involving the autoantibodies serum anti-tissue transglutaminase (tTG) and anti-endomysial antibodies (EMA) in individuals with the genetic pre-disposition for CD and affects approximately 1 per cent of the general population[7]. Symptoms can include a range of gastro-intestinal symptoms such as diarrhoea, constipation, and bloating but also extra-intestinal symptoms such as anaemia, peripheral neuropathy, osteoporosis, joint/ muscle pain and fatigue[2,9]. It may develop at any age and diagnosis is made from positive serology and coeliac histology[9]. These tests require gluten to be in the diet at the time they are carried out so if it has already been removed, reintroduction of at least 3g a day (two slices of bread) for two to eight weeks is necessary prior to testing[8]. Seronegative CD, however, ranges from 6-22 per cent of all diagnosed cases[8]. Once diagnosed, a strict gluten free diet is necessary to manage symptoms and allow intestinal mucosa to recover. Dermatitis herpetiformis (DH) and gluten ataxia (GA) are further disorders related to gluten ingestion, affecting the skin and cerebellum respectively[6].

However, reactions to the gluten containing grains have been found to occur where neither allergic nor autoimmune mechanisms seem to be involved[6]. These have been termed non-coeliac gluten sensitivity (NCGS) and it is suggested that an innate immune response is involved[9], but there are currently no objective laboratory markers specific to NCGS[10]. Symptoms are similar to CD with gastro-intestinal and extra-intestinal symptoms seen, although in children the extra-intestinal symptoms may be less frequent[11]. Patients are often diagnosed with Irritable Bowel Syndrome (IBS) once CD and other inflammatory conditions have been ruled out. As there are no bio-markers to confirm diagnosis many individuals self-diagnose NCGS[6].

Symptoms of IBS overlap greatly with those of CD and NCGS. There has been much research and interest in managing IBS symptoms by reducing dietary intake of a range of short-chain fermentable carbohydrates termed Fermentable Oligo-saccharides, Di-saccharides, Mono-saccharides and Polyols (FODMAPs). Their poor absorption in the small intestine results in osmotically active molecules being rapidly fermented by the gut microbiota[12]. The diet involves avoiding and reintroducing to tolerance a wide range of foods such as wheat, rye and barley, certain fruits, vegetables and lactose from dairy products and has been found to be an effective approach to managing symptoms[13]. A number of studies have suggested how gluten may cause IBS type symptoms in the absence of coeliac disease[14-16], yet a

more recent study investigating the effect of gluten in patients with NCGS and IBS whilst controlling for FODMAP intake did not find any evidence of gluten specific effects[17].

It is not yet clear therefore whether IBS-type symptom improvement following removal of wheat, rye and barley on a gluten free diet or as part of a low FODMAP diet is due to the removal of the gluten proteins, the fermentable carbohydrate fraction or indeed non gluten proteins such as lectins, germ agglutenins or alpha-amylase trypsin inhibitors[4]. Other proteins such as alpha-tryptase inhibitors (ATIs), the primary molecules for resisting pests and diseases, are also found in greater amounts in modern varieties of wheat which have been bred to be more pest resistant[18]. These non-gluten proteins have been found to elicit strong innate immune effects which may also be significant in CD, NCGS, WA and IBS[18]. It is also suggested that wheat proteins, particularly in modern varieties, trigger pro-inflammatory mechanisms dependent on the wheat variety and independent of the gluten content[4] Uncontaminated oats are often tolerated however and considered to generally be safe for diagnosed coeliacs which can help provide variety and a source of fibre to the diet[8].

In conclusion, wheat can elicit a wide range of symptoms and when removed from the diet symptom improvement may be due to the removal of the gluten, other proteins or fermentable carbohydrates. Further research is required to establish the mechanisms involved, whilst the gluten free product market continues to grow.

> Wheat can elicit a wide range of symptoms and when removed from the diet symptom improvement may be due to the removal of the gluten, other proteins or fermentable carbohydrates

References

1. Tatham AS and Shewry PR. Allergens in wheat and related cereals. Clin Exp Allergy 2008; 38: 1712-1726.
2. Tovoli F, Masi C, Guidetti E et al. Clinical and diagnostic aspects of gluten related disorders. World J Clin Cases 2015; 3(3): 275-284.
3. Shewry PR. Wheat. J Exp Bot 2009; 60(6):1537-53.
4. Valerii MC, Ricci C, Spisni E et al. Responses of peripheral blood mononucleated cells from non-celiac gluten sensitive patients to various cereal sources. Food Chem 2015; 176:167-174.
5. Volta U and De Giorgio R. New understanding of gluten sensitivity. Nat Rev Gastroenterol Hepatol 2012; 9: 295-299.
6. Sapone A, Bai JC, Ciacci C et al. Spectrum of gluten related disorders: consensus on new nomenclature and classification. BMC Medicine 2012; 10:13.
7. Leonard MM and Vasagar B. US perspective on gluten-related diseases. Clin Exp Gastroenterol 2014; 7:25-37.
8. Ludvigsson JF, Bai JC, Biagi F et al. Diagnosis and management of adult coeliac disease: guidelines from the British Society of Gastroenterology. Gut 2014; 63(8): 1210-28.
9. Ludvigsson JF, Leffler DA, Bai JC et al. The Oslo definitions for coeliac disease and related terms. Gut 2013; 62: 43-52.
10. Hollon J, Leonard Puppa E, Greenwald B et al. Effect of gliadin on permeability of intestinal biopsy explants from celiac disease patients and patients with non-celiac gluten sensitivity. Nutrients 2015; 7; 1565-1576.
11. Czaja-Bulsa G. Non coeliac gluten sensitivity- a new disease with gluten intolerance. Clin Nutr 2015; 34(2): 189-94.
12. Gibson PR and Shepherd SJ. Evidence based dietary symptoms of functional gastrointestinal symptoms: the FODMAP approach. J Gastroenterol Hepatol 2010; 25(2): 252-8.
13. Staudacher HM, Irving PM, Lomer MCE et al. Mechanisms and efficacy of dietary FODMAP restriction in IBS. Nat Rev Gastroenterol Hepatol 2014; 11(4): 256-66.
14. Biesiekierski JR, Newnham ED, Irving PM et al. Gluten causes gastrointestinal symptoms in subjects without coeliac disease: a double-blind randomized placebo-controlled trial. Am J Gastroenterol 2011; 106(3): 508-14.
15. Carroccio A, Mansueto P, Iacono G et al. Non-coeliac wheat sensitivity diagnosed by double blind placebo-controlled challenge: exploring a new clinical entity. Am J Gastroenterol 2012; 107: 1898-1906.
16. Vazquez-Rocque MI, Camilleri M, Smyrk T et al. A controlled trial of gluten free diet in patients with Irritable Bowel Syndrome-diarrhoea; effects of bowel frequency and intestinal function. Gastroenterology 2013; 144: 903-911.
17. Biesiekierski JR, Peters SL, Newnham ED et al. No effect of gluten in patients with self-reported non-coeliac gluten sensitivity after dietary reduction of fermenatable, poorly absorbed, short-chain carbohydrates. Gastroenterology 2013; 145:330-328.
18. Junker Y, Zeissig S, Kim S-J et al. Wheat amylase trypsin inhibitors drive intestinal inflammation via activation of toll-like receptor 4. J Exp Med 2012; 209(13):2395-408.

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