Chemical Immunology and Allergy

Vol. 101

Series Editors

Johannes Ring  Munich
Kurt Blaser  Davos
Monique Capron  Lille
Judah A. Denburg  Hamilton, Ont.
Stephen T. Holgate  Southampton
Gianni Marone  Naples
Hirohisa Saito  Tokyo
# Contents

## xv Preface
Ebisawa, M. (Sagamihara); Ballmer-Weber, B.K. (Zurich); Vieths, S. (Langen); Wood, R.A. (Baltimore, Md.)

## Background

1 **Historical Background, Definitions and Differential Diagnosis**
Sampson, H.A. (New York, N.Y.)

* 1 Abstract
* 1 Historical Background
* 3 Definitions and Differential Diagnosis
* 5 Recent History and the Future
* 7 References

8 **Immunological Basis of Food Allergy (IgE-Mediated, Non-IgE-Mediated, and Tolerance)**
Kim, E.H.; Burks, W. (Chapel Hill, N.C.)

* 8 Abstract
* 8 Introduction
* 9 IgE-Mediated Food Allergy
* 11 Non-IgE-Mediated Food Allergy
* 12 Mixed-Immune Food Reactions
* 13 Oral Tolerance
* 14 Conclusion
* 16 References

18 **Food Allergens: Molecular and Immunological Aspects, Allergen Databases and Cross-Reactivity**
Lorenz, A.-R.; Scheurer, S.; Vieths, S. (Langen)

* 18 Abstract
* 19 Molecular Features of Food Allergens
  * 19 Allergen Families
  * 20 Allergen Databases
* 22 Class I Food Allergens/Class II Food Allergens
  * 22 Class I Food Allergens
  * 23 Class II Food Allergens
* 23 Resistance to Food Processing and Digestion
  * 23 Thermal Stability of Allergens
* 24 Influence of Digestion on Allergic Reaction to Food Allergens
* 25 Influence of the Food Matrix on Digestion and Allergenicity of Food Allergens
59  **Hints for Diagnosis**  
Poulsen, L.K. (Copenhagen)

59  Abstract
59  The Purpose of the Diagnosis
59  Is It Food Allergy?
61  Which Is the Culprit Food?
62  Which Allergens Are Involved?
62  How Much Is Too Much?
63  Prerequisites for Diagnosis
63  The Diagnostic Process
66  Who Should Perform the Diagnosis?
66  Conclusions
66  References

68  **IgE-Related Examination in Food Allergy with Focus on Allergen Components**  
Borres, M.P. (Uppsala); Sato, S.; Ebisawa, M. (Sagamihara)

68  Abstract
68  How IgE-Mediated Food Allergy Is Diagnosed
69  Component-Resolved Diagnostics
69  Development of a Test for Allergen Components
69  Heat Stability in Proteins
71  Species-Specific and Cross-Reactive Proteins
72  New Allergen Component Test: An Emerging Field of Interest
73  Temporal Development of Allergen Components
74  Singleplex versus Multiplex Testing
75  Future Perspectives
75  Skin Prick Test
75  Basophil Activation Test
75  Mechanisms of Basophil Activation
76  Histamine Release Test
76  Expression of the Basophil Activation Markers CD63 and CD203c
76  Correlation of the Skin Prick Test and the Basophil Activation Test with Oral Immunotherapy
77  References

79  **Non-IgE-Related Diagnostic Methods (LST, Patch Test)**  
Matsumoto, K. (Tokyo)

79  Abstract
79  Introduction
80  Lymphocyte Stimulation Test
80  Peripheral Blood Mononuclear Cells
81  Antigens
81  Culture System
81  Measurements
81  Interpretation
82  Future Perspectives
82  Patch Test/Atopy Patch Test
82  Indication for Testing
83  Atopy Patch Test Methods
Allergen-Based Food Allergies

114 **Cow’s Milk Allergy in Children and Adults**
   Fiocchi, A.; Dahdah, L. (Rome); Albarini, M.; Martelli, A. (Milan)

114 Abstract
114 Introduction
114 Epidemiology
115 Pathogenesis
115 Allergens
115 Clinical Manifestations
116 Immediate Reactions
116 Delayed Reactions
117 Diagnosis
117 Clinical Evaluation
117 Diagnostic Tests
117 IgE-Mediated CMA
117 Non-IgE-Mediated CMA
118 Elimination-Challenge Testing
118 Natural History
118 Treatment of Cow’s Milk Allergy
118 Avoidance of Cow’s Milk Protein
119 Alternative Formulae (Milk Substitutes)
119 Oral Immunotherapy
120 Follow-Up
121 A Very Common Clinical Case
122 Conclusions
122 References

124 **Hen’s Egg Allergy**
   Urisu, A.; Kondo, Y. (Nagoya); Tsuge, I. (Toyoake)

124 Abstract
124 Introduction
125 Symptoms
125 Allergenic Components of Egg White
126 Allergenic Components of Egg Yolk
126 Diagnosis
127 Natural History
128 Management and Therapy
128 Oral Immunotherapy to Egg Allergy
129 Clinical Case
129 Acknowledgments
129 References

131 **Peanut and Tree Nut Allergy**
   Cox, A.; Sicherer, S.H. (New York, N.Y.)

131 Abstract
131 Introduction
131 Epidemiology
Food Allergy: Psychosocial Impact and Public Policy Implications
Sharma, H.P.; Herbert, L.J. (Washington, D.C.)

Abstract
Introduction
Food Allergy Knowledge and Attitudes
Impact of Food Allergy on Daily Life
Current Food Allergy-Related Public Policy
Implications and Future Directions
References

Worldwide Food Allergy Labeling and Detection of Allergens in Processed Foods
Taylor, S.L.; Baumert, J.L. (Lincoln, Nebr.)

Abstract
Introduction
Labeling of Allergenic Foods
Ingredient Labeling and Exemptions
Advisory Labeling
Detection of Food Allergen Residues
Quantitative Immunoassay Methods
Qualitative Immunoassay Methods
Conclusion
References

The Effects of Food Allergy on Quality of Life
DunnGalvin, A. (Cork); Dubois, A.E.J.; Flokstra-de Blok, B.M.J. (Groningen); Hourihane, J.O’B. (Cork)

Abstract
Introduction
Main Body
The Parental Perspective: Quantitative
The Child, Adolescent and Adult Perspective: Quantitative
Qualitative Studies on the Impact of Food Allergy on Health-Related Quality of Life
The Parent Perspective
Children and Teens
Discussion
Improving HRQL
Conclusion
References

Prevention of Food Allergy

Abstract
Introduction
Methodological Challenges
Onset of Sensitisation and Food Allergy
Maternal Diet (During Pregnancy and/or Breastfeeding) and the Prevention of Food Allergy
Complementary Infant Feeding and the Prevention of Food Allergy
Combined Maternal and Infant Dietary Measures and the Prevention of Food Allergy
Routes of Sensitisation
Oral Tolerance Induction
Unpasteurised Milk, Probiotics and Prebiotics
Nutritional Supplements
Conclusions
References
Educational Programmes in Food Allergy
Kugler, C.; Brockow, K. (München); Ring, J. (Davos)

Abstract
Introduction
Individual Dietetic Treatment of Food Allergy
Structured Educational Group Sessions for Patients and Families with Atopic Eczema or Anaphylaxis
Educational Programmes for Atopic Eczema
   Educational Programmes for the Control of Atopic Eczema in Children and Adolescents (According to
   'Arbeitsgemeinschaft Neurodermitis-Schulung')
   Educational Programmes for the Management of Atopic Eczema in Adults ('Arbeitsgemeinschaft
   Neurodermitis-Schulung für Erwachsene')
Educational Program for Anaphylaxis Patients and Families
References

Acknowledgments
Author Index
Subject Index
Although food allergy was first described a long time ago, as outlined in the chapter ‘Historical background, definitions, and differential diagnosis’, only in recent times has it started to be recognized as one of the major allergic diseases. In the past 50 years since the discovery of IgE by Dr. K. Ishizaka, we have experienced a steep increase in the prevalence of allergic diseases. The prevalence of food allergy around the world has not yet been clarified in detail. It is quite obvious that we have faced a rapid increase in patients with food allergy in both childhood and adulthood in most developed countries in the past 3 decades. The number of publications on food allergy reached 100/year in 1971 based on a PubMed search, and it went up to 500/year at the beginning of the 21st century and finally to more than 1,200/year in 2014. It is clear that food allergy research is currently a very hot topic among academics and that issues related to food allergy attract a lot of attention. We have collaborated with distinguished, world-class professionals on food allergy research and practice to put this book together. The topics are very practical and applicable to your practice. We hope that this book on food allergy will help clinicians, academics, and paramedics to better understand current food allergy practice and research.

Motohiro Ebisawa, Sagamihara
Barbara K. Ballmer-Weber, Zurich
Stefan Vieths, Langen
Robert A. Wood, Baltimore, Md.