Parasites and Allergy

Volume Editors

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Contents

XI Foreword

1 Helminth-Induced Immunoregulation of an Allergic Response to Food
    1 Abstract
    1 Microbes and Allergy
    3 Enteric Helminth Infection Acts as a Th2-Polarizing Mucosal Adjuvant
    5 Enteric Helminth Infection Induces Th2 Responses without Atopy
    8 How Does Helminth Infection Protect against Allergy: Immunoregulatory T or B Cells
    11 Conclusions
    11 References

14 The Mutual Influence of Nematode Infection and Allergy
    D. Negrão-Corrêa, M.M. Teixeira, Belo Horizonte
    14 Abstract
    14 The Worldwide Relevance of Nematode Infections
    15 Nematode Infections and the Hygiene Hypothesis
    17 The Model of S. venezuelensis Infection in Rodents
    18 S. venezuelensis Infection Induces Eosinophilic Airway Inflammation and Airway Hyperreactivity
    20 Airway Hyperreactivity Is Shut Off by S. venezuelensis Infection but Prevents Parasite Infection
    22 Role of a Th2 Immune Response for S. venezuelensis Elimination from the Intestine
    25 Concluding Remarks
29 Human Schistosomiasis Decreases Immune Responses to Allergens and Clinical Manifestations of Asthma

M.I. Araujo, E.M. de Carvalho, Salvador

Abstract

Immunological Response and Clinical Forms of Schistosomiasis

Down-Modulation of Type 1 Immune Response in *S. mansoni* Infection

Influence of Parasite Infection on the Development of Atopy and Asthma

References

45 Proteases in Helminth- and Allergen-Induced Inflammatory Responses

S. Donnelly, J.P. Dalton, Sydney; A. Loukas, Brisbane

Abstract

Proteases Are Major Allergens Derived from Various Organisms

How Do Proteases Act as Allergens?

Disruption of the Epithelial Barrier

Modulation of Dendritic Cell (DC) Function

Modulation of B and T Cell Function

Activation of Mast Cells Via Protease Activated Receptors

Alteration of the Protease/Anti-Protease Balance

Proteases Provoke Allergenic Responses to Non-Peptidolytic Molecules

Do Parasites Exacerbate or Protect against Allergy?

Helminth Parasites Secrete Proteases

Can Parasite Proteases Sensitise Individuals to Environmental Proteases *Via* Cross-Reactive IgE?

Parasite Peptidolytic Activity May Sensitise Individuals to Allergens

Degranulation of Mast Cells and Basophils

Modulation of T Cell Responses

Recruitment and Activation of Alternatively Activated Macrophages

Are Helminth Proteases Allergens?

Conclusion

Acknowledgements

References

65 Mechanisms Underlying Helminth-Induced Th2 Polarization: Default, Negative or Positive Pathways?

D. Jankovic, S. Steinfelder, M.C. Kullberg, A. Sher, Bethesda, Md.

Abstract

The Immune Response during Infection with *Schistosoma mansoni*

Role of IL-4 in *S. mansoni*-Induced Th2 Polarization

*S. mansoni*-Induced Th2 Polarization Requires DC: Evidence against a Default Pathway

*S. mansoni* Th2 Polarization As A Negative Pathway: Down-Regulation of DC Functions
82 *Regulation of Dendritic Cell Function by Pathogen-Derived Molecules Plays a Key Role in Dictating the Outcome of the Adaptive Immune Response*  
E.J. Pearce, C.M. Kane, J. Sun, Philadelphia, Pa.

Abstract

Dendritic Cells and Their Role in Th Cell Activation

Th Response Polarization

The Interaction of SEA with DCs

Eggs and SEA Induce Different Responses – An Unexpected Finding

SEA Inhibits TLR-Initiated DC Maturation

TLR-Ligand-Activated DCs Provide Negative Instruction for Th2 Response Polarization

Acknowledgements

References

91 *Glycans Modulate Immune Responses in Helminth Infections and Allergy*  
I. van Die, Amsterdam; R.D. Cummings, Oklahoma City, Okla.

Abstract

Glycan Ags in Schistosomes

Schistosome Glycan Ags Generate High Levels of Anti-Glycan Abs in Infection

Helminth- and Allergen-Derived Glycan Ags Induce Th2 Responses

Immunogenic Glycan Ags Shared between Helminths and Allergens Are IgE Epitopes

Glycan Ags Regulate Immune Responses via Interaction with Host Lectins

C-Type Lectins on Antigen-Presenting Cells Recognize Glycan Ags

Recognition of Schistosome- or Allergen-Derived Glycan Ags by Antigen-Presenting Cells

Schistosome Egg Glycan Ags Interact with DC-SIGN

L-SIGN Binds Schistosome Egg Glycan Ags

Interaction of Schistosome Glycan Ags with hMGL

The Mannose Receptor Recognizes Ags from Schistosome Eggs and House Dust Mite Der p I

Host Protection Mechanisms May Include the Binding of Glycosylated Ags by Soluble Lectins in Schistosomiasis and Allergy

Interaction of Helminth Glycan Ags and Allergens with Collectins

Galectin-3 Recognizes LDN Glycan Ags within Schistosome SEA

Does IL-10 Production Induced by Parasite Glycans Contribute to Protection Against Allergy?

Concluding Remarks

Acknowledgements

References

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Contents

VII
113 Role of the Natural Killer T Lymphocytes in Th2 Responses during Allergic Asthma and Helminth Parasitic Diseases
F. Trottein, T. Mallevaey, C. Faveeuw, M. Capron, Lille; M. Leite-de-Moraes, Paris

113 Abstract
114 Classification and General Features of NK T Cells
115 NK T Cells in Autoimmune, Neoplastic and Infectious Diseases
117 NK T Cells in Th2 Inflammatory Response during Allergic Asthma
118 Mechanisms of NK T Cell Activation and Mode of NK T Cell Actions during Allergic Asthma
119 NK T Cells during Helminth Infection
122 Mechanisms by which NK T Cells Become Activated during Infection
122 NK T Cells in Regulatory Mechanisms during Th2-Related Inflammation
124 Conclusions
124 Acknowledgements
125 References

128 The Mast Cell and Gut Nematodes: Damage and Defence
J.L. Pennock, R.K. Grencis, Manchester

128 Abstract
129 Regulation of Mucosal Mast Cells
131 Adhesion and Homing of Mast Cells to the Gut
132 Effector Mechanisms
136 Current Ideas
137 Acknowledgements
138 References

141 Basophils, Basophilia and Helminth Infections
E. Mitre, T.B. Nutman, Bethesda, Md.

141 Abstract
142 Basophil Biology
142 Lineage
142 Growth and Development
143 Trafficking
144 Basophil Function
144 Basophil Activation
144 IgE-Mediated Activation
145 Non-IgE Activation
146 Degranulation
146 Activation Markers
146 Effector Molecules
147 Histamine
147 Other Effector Molecules
148 Immunomodulatory Capabilities
148 Cytokine Release
148 Immunomodulatory Properties of Histamine
149 Basophils and the Immune Response to Helminth Infections
One of the key words of immunology at the beginning of the 21st century is ‘regulation’. Twenty-five years later the Th1/Th2 paradigm, the concept of regulatory cell populations, is now in the heart of our understanding of immune response.

Helminths and allergic conditions are recognized as the main Th2 cell inducers. The negative association of allergic manifestations and helminth infections has been debated for over 30 years. It is, however, only in the recent past, that modulation of allergy by helminth infections has been clearly substantiated and shown to be consistent with the activity of regulatory cell populations, which control effector mechanisms of both Th1 and Th2 types.

Although remarkable progress has been made in identifying the molecular events required for Th2 differentiation, a number of questions which are addressed in this volume point to essential challenges.

Several contributions illustrate the critical importance of characterization of helminth molecules with Th2 or regulatory inducing activities and their modes of action in dendritic cells.

The large emphasis given to glycan epitopes highlights the profound immunomodulatory properties of glycan antigens and their role in inducing two key regulatory cytokines IL-10 and TGF-β. It is striking that the specificity of helminth infection does not influence the profile of the regulatory response: Schistosomes, Onchocerca, Wuchereria or gut nematodes for instance, induce similar patterns of cytokine production, the regulation appearing more related to the chronicity of infections than to the pathogen itself.
Although the identification of regulatory cell populations has progressed, we are left with a global notion of heterogeneity and a rather unclear respective role of the various incriminated populations: regulatory T and B cells, natural killer T cells, mast cells and basophils, etc. The concept that primary and secondary regulatory populations may account for their heterogeneity is very stimulating, and the role of Fox p 3 as a master control gene is very attractive.

Whereas most of the contributions discuss the down-modulation of allergy by helminths, there is also some evidence that allergy or predisposition to atopic diseases may protect against helminth infections. It is, on the other hand, of particular interest that removal or inhibition of regulatory T cells leads to the effective clearance of infection and restoration of antigen specific activity.

In practical terms, one may expect that allergen-specific immunotherapy, which generates populations of allergen-specific regulatory T cells, producing IL-10 and TGF-β, can significantly reduce allergic manifestations. Conversely, successful immunization against helminth infections and the development of efficient vaccines will certainly rely on a subtle balance between the induction of appropriate effector mechanisms and the expression of regulatory responses.

In this context, the various contributions to this volume dedicated to Parasites and Allergy reveal a new dimension of host-parasite interactions and of the importance of anti-inflammatory responses in chronic helminthiasis. They also provide a novel insight on the possible modes of down-modulation of unwarranted immune responses. They finally pave the way to new directions of research for the successful immunization against helminths and the prevention of inflammatory responses in allergic and autoimmune diseases.

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