Parasites and Allergy
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Parasites and Allergy

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27 figures, 1 in color, and 2 tables, 2006
## Contents

### XI Foreword

1 **Helminth-Induced Immunoregulation of an Allergic Response to Food**  

- Abstract
- Microbes and Allergy
- Enteric Helminth Infection Acts as a Th2-Polarizing Mucosal Adjuvant
- Enteric Helminth Infection Induces Th2 Responses without Atopy
- How Does Helminth Infection Protect against Allergy: Immunoregulatory T or B Cells
- Conclusions
- References

14 **The Mutual Influence of Nematode Infection and Allergy**  
*D. Negrão-Corrêa, M.M. Teixeira*, Belo Horizonte

- Abstract
- The Worldwide Relevance of Nematode Infections
- Nematode Infections and the Hygiene Hypothesis
- The Model of *S. venezuelensis* Infection in Rodents
- *S. venezuelensis* Infection Induces Eosinophilic Airway Inflammation and Airway Hyperreactivity
- Airway Hyperreactivity Is Shut Off by *S. venezuelensis* Infection but Prevents Parasite Infection
- Role of a Th2 Immune Response for *S. venezuelensis* Elimination from the Intestine
- Concluding Remarks
29 Human Schistosomiasis Decreases Immune Responses to Allergens and Clinical Manifestations of Asthma

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

Abstract

29 Immunological Response and Clinical Forms of Schistosomiasis
31 Down-Modulation of Type 1 Immune Response in S. mansoni Infection
35 Immune Response in Atopy
36 Influence of Parasite Infection on the Development of Atopy and Asthma
42 References

45 Proteases in Helminth- and Allergen-Induced Inflammatory Responses

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

Abstract

48 Proteases Are Major Allergens Derived from Various Organisms
49 How Do Proteases Act as Allergens?
50 Disruption of the Epithelial Barrier
50 Modulation of Dendritic Cell (DC) Function
50 Modulation of B and T Cell Function
50 Activation of Mast Cells Via Protease Activated Receptors
51 Alteration of the Protease/Anti-Protease Balance
52 Proteases Provoke Allergenic Responses to Non-Peptidolytic Molecules
53 Do Parasites Exacerbate or Protect against Allergy?
54 Helminth Parasites Secrete Proteases
54 Can Parasite Proteases Sensitise Individuals to Environmental Proteases Via Cross-Reactive IgE?
55 Parasite Peptidolytic Activity May Sensitise Individuals to Allergens
56 Degranulation of Mast Cells and Basophils
57 Modulation of T Cell Responses
58 Recruitment and Activation of Alternatively Activated Macrophages
58 Are Helminth Proteases Allergens?
61 Conclusion
62 Acknowledgements
62 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

66 The Immune Response during Infection with Schistosoma mansoni
67 Role of IL-4 in S. mansoni-Induced Th2 Polarization
69 S. mansoni-Induced Th2 Polarization Requires DC: Evidence against a Default Pathway
71 S. mansoni Th2 Polarization As A Negative Pathway: Down-Regulation of DC Functions
73  *S. mansoni* Th2 Polarization As A Positive Pathway: Selective Activation of DC
74  How Do SEA-Conditioned DC Promote IL-4 Secretion in CD4+ Cells?
77  Conclusions
77  Acknowledgements
78  References

82  **Regulation of Dendritic Cell Function by Pathogen-Derived Molecules Plays a Key Role in Dictating the Outcome of the Adaptive Immune Response**


Abstract
83  Dendritic Cells and Their Role in Th Cell Activation
84  Th Response Polarization
85  The Interaction of SEA with DCs
86  Eggs and SEA Induce Different Responses – An Unexpected Finding
87  SEA Inhibits TLR-Initiated DC Maturation
88  TLR-Ligand-Activated DCs Provide Negative Instruction for Th2 Response Polarization
89  Acknowledgements
89  References

91  **Glycans Modulate Immune Responses in Helminth Infections and Allergy**

*I. van Die*, Amsterdam; *R.D. Cummings*, Oklahoma City, Okla.

Abstract
93  Glycan Ags in Schistosomes
95  Schistosome Glycan Ags Generate High Levels of Anti-Glycan Abs in Infection
97  Helminth- and Allergen-Derived Glycan Ags Induce Th2 Responses
98  Immunogenic Glycan Ags Shared between Helminths and Allergens Are IgE Epitopes
100  Glycan Ags Regulate Immune Responses via Interaction with Host Lectins
101  C-Type Lectins on Antigen-Presenting Cells Recognize Glycan Ags
102  Recognition of Schistosome- or Allergen-Derived Glycan Ags by Antigen-Presenting Cells
102  Schistosome Egg Glycan Ags Interact with DC-SIGN
103  L-SIGN Binds Schistosome Egg Glycan Ags
103  Interaction of Schistosome Glycan Ags with hMGL
104  The Mannose Receptor Recognizes Ags from Schistosome Eggs and House Dust Mite Der p 1
104  Host Protection Mechanisms May Include the Binding of Glycosylated Ags by Soluble Lectins in Schistosomiasis and Allergy
105  Interaction of Helminth Glycan Ags and Allergens with Collectins
105  Galectin-3 Recognizes LDN Glycan Ags within Schistosome SEA
106  Does IL-10 Production Induced by Parasite Glycans Contribute to Protection Against Allergy?
108  Concluding Remarks
109  Acknowledgements
109  References
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
<table>
<thead>
<tr>
<th>Page</th>
<th>Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>150</td>
<td>Basophilia</td>
</tr>
<tr>
<td>151</td>
<td>Basophil Activation in Helminth Infections</td>
</tr>
<tr>
<td>151</td>
<td>Helminth Antigens as ‘Super Allergens’</td>
</tr>
<tr>
<td>152</td>
<td>Potential Roles of Basophils in Helminth Infections</td>
</tr>
<tr>
<td>154</td>
<td>References</td>
</tr>
</tbody>
</table>
| 157  | **Innate, Adaptive and Regulatory Responses in Schistosomiasis: Relationship to Allergy**  
*F.C. Hartgers, H.H. Smits, Leiden; D. van der Kleij, Rijswijk; M. Yazdanbakhsh, Leiden* |
| 158  | Abstract |
| 158  | Innate Immune Responses in Schistosomiasis |
| 160  | Adaptive Immune Responses in Schistosomiasis |
| 162  | Downregulation of the Immune Response during Chronic Schistosome Infection |
| 162  | Modulation of Innate Responses |
| 165  | Modulation of Adaptive Responses |
| 165  | Modulation via Regulatory T Cells |
| 167  | Relationship between Schistosomiasis and Allergy |
| 167  | Prevention of Atopy |
| 168  | Role of Regulatory T Cells |
| 169  | IgG4 Antibodies and IL-13 Decoy Receptor |
| 171  | The Window of Immune Suppression |
| 172  | Concluding Remarks |
| 172  | Acknowledgements |
| 172  | References |
| 176  | **Regulatory T Cells Induced by Parasites and the Modulation of Allergic Responses**  
*M.S. Wilson, R.M. Maizels, Edinburgh* |
| 176  | Abstract |
| 177  | The Cellular Basis of Allergic Diseases |
| 179  | Regulatory T Cell (Treg) Biology |
| 181  | Regulatory T Cells in Allergic Diseases |
| 183  | Helminth-Mediated Immune Regulation and Treg Cells |
| 184  | Helminth Infection and Allergic Disease |
| 186  | Model Systems for Infection and Allergy |
| 189  | Alternative Models |
| 190  | Molecular Mechanisms at the Parasite-Allergy Interface |
| 191  | Infectious Tolerance and the Specificity of Treg Cells |
| 192  | Conclusions |
| 193  | References |
| 196  | **Author Index** |
| 197  | **Subject Index** |
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 Foxp3 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.

Andre and Monique Capron, Lille