

# Nature

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# REVIEWS

march 2014 volume 14 no. 3  
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Homeostatic immune  
responses

## IMMUNOLOGY



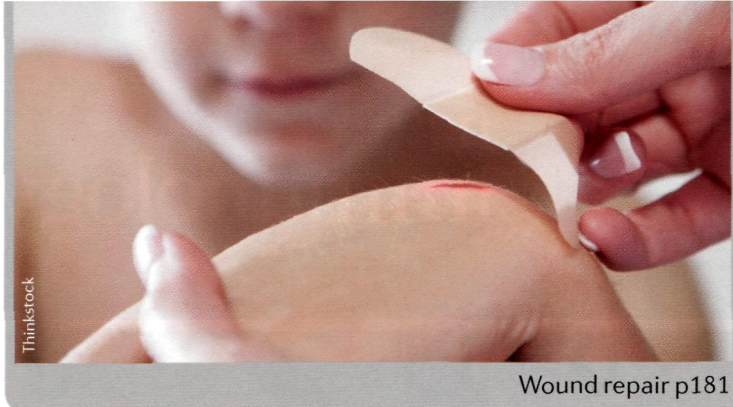
### **UNDER THE SURFACE**

*Exploring the immune system's  
hidden talents*

### **Immune pathways that maintain stability**

Keeping us afloat





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Lance W. Peterson and David Artis

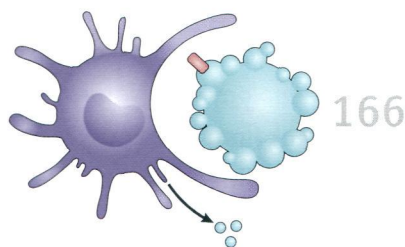
Intestinal epithelial cells (IECs) promote gut homeostasis by coordinating the segregation and regulation of commensal microorganisms and the host immune system. This Review highlights the diverse and multifaceted roles of IECs in barrier function, and in their regulation of innate and adaptive immune cell function and homeostasis in response to microbial colonization.

### 154 Homeostatic control of regulatory T cell diversity

Adrian Liston and Daniel H. D. Gray

Regulatory T ( $T_{Reg}$ ) cells are crucial for maintaining immune homeostasis in the body, with recent data showing that distinct  $T_{Reg}$  cell subsets become specialized to function in different tissues. Here, Liston and Gray highlight the need to regulate the number and function of the  $T_{Reg}$  cells themselves, and they describe the dynamic processes that achieve this homeostasis and functional specialization of  $T_{Reg}$  cell subsets.

FEATURED ARTICLE



### 166 Apoptotic cell clearance: basic biology and therapeutic potential

Ivan K. H. Poon, Christopher D. Lucas, Adriano G. Rossi and Kodi S. Ravichandran

The removal of apoptotic cells by phagocytes is essential for the maintenance of tissue homeostasis and is usually immunologically silent. However, dysregulation of this process is associated with numerous inflammatory and autoimmune diseases, and thus the therapeutic manipulation of apoptotic cell clearance by phagocytes may be a means to treat these diseases.

### 181 Liver fibrosis and repair: immune regulation of wound healing in a solid organ

Antonella Pellicoro, Prakash Ramachandran, John P. Iredale and Jonathan A. Fallowfield

The immune regulation of liver fibrosis (particularly the distinct and opposing roles of macrophage subsets) provides an informative model of the endogenous mechanisms that mediate the resolution of fibrosis and the restoration of tissue homeostasis.

### 195 Regulation of immune responses by extracellular vesicles

Paul D. Robbins and Adrian E. Morelli

Extracellular vesicles, including exosomes, provide a means of intercellular communication for immune regulation. Here, the authors describe how the proteins, nucleic acids and other molecules that they carry influence immune responses, and explore their potential use in the treatment of inflammatory and autoimmune diseases, and cancer.

## On the web [www.nature.com/reviews/immunol](http://www.nature.com/reviews/immunol)

### Advance online publication

We operate an advance online publication (AOP) service for authors and readers to view the latest articles published online ahead of print.

### Forthcoming articles:

Pathological pain and the neuroimmune interface  
*Peter M. Grace, Mark R. Hutchinson, Steven F. Maier and Linda R. Watkins*

Leukocyte migration in the interstitial space of non-lymphoid organs  
*Wolfgang Weninger, Maté Biro and Rohit Jain*

## FOCUS ON HOMEOSTATIC IMMUNE RESPONSES

This issue features a Focus on Homeostatic immune responses — see the articles marked with the above logo. These articles can also be found online at: <http://www.nature.com/nri/focus/homeostasis>

### Links to further information

The full text of articles includes author biographies, links to glossary terms and links to websites and databases with relevant information.

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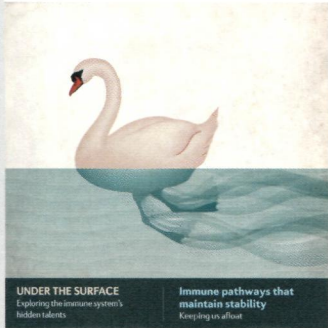


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Homeostatic immune responses

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**UNDER THE SURFACE**  
Exploring the immune system's hidden talents

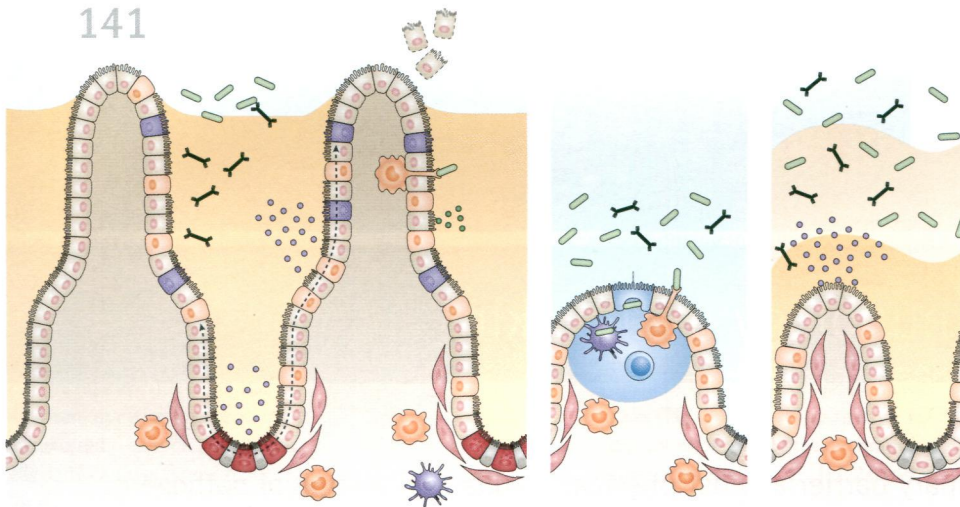
**Immune pathways that maintain stability**  
Keeping us afloat

► **COVER:** 'Unseen effort' by Simon Bradbrook, inspired by this month's Focus on Homeostatic immune responses.

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- ◉ 137 INNATE LYMPHOID CELLS Nutrients direct immune balance
- ◉ 138 IN BRIEF Macrophages | Cytokines | Neonatal immunity
- T CELLS T<sub>H</sub>9 cells creep under the skin
- MUCOSAL IMMUNOLOGY Fungal monopoly promotes allergy
- 139 IN BRIEF Dendritic cells | T cells | Inflammation

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