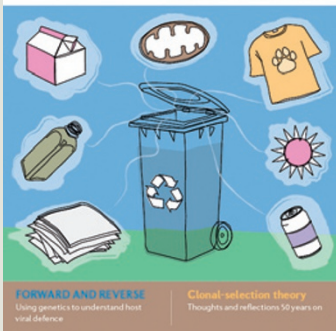




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IMMUNOLOGY



► **COVER:** 'Reduce, reuse, recycle' by Neil Smith, inspired by the Review on p767.



ELAINE BELL



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LUCY BIRD



OLIVE LEAVY



SHARON AHMAD

**W**e can learn a lot by retracing the roots of immunological pathways and concepts that we study today. For example, understanding how ancient pathways of viral detection and suppression have evolved from flies to humans provides clues to our resistance to viral infection and reveals how viruses have shaped our genomes. Indeed, the need for multiple resistance strategies in mammals reflects the fact that viruses have evolved numerous mechanisms to evade individual defences. On page 753, Bruce Beutler and colleagues describe these recent insights into resistance to viral infection gleaned from genetic analyses of flies and mammals.

Another ancient pathway, conserved from yeast to humans, explains how the immune system disposes of a microorganism without disposing of the entire infected cell. Autophagy — a primordial cellular homeostatic process for recycling, remodelling or disposing of unwanted cytoplasmic constituents — is emerging as a central player in the immunological control of infection. As reviewed by Beth Levine and Vojo Deretic (on page 767), autophagy is now implicated in defence against pathogens, antigen processing and presentation, T-cell homeostasis and disease.

Elsewhere in this issue, we reminisce about the early beginnings of a key concept in immunology that has shaped our thinking today. In a Viewpoint article on page 823, six scientists cast their minds back 50 years to the days when the structure of DNA had only just been solved and Burnet published his theory for antibody diversity — the clonal-selection theory. With this was born the realization that the selectable element in immunity was the cell and not the antibody, and that specificity for diverse antigens exists before these antigens are encountered. Although there still remain some opponents to the theory, few can argue that it set the premise for modern immunology.

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