

# Correspondence

## Nobels: Toll pioneers deserve recognition

Immunologists are delighted that the field of innate immunity has been recognized by this year's Nobel Prize in Physiology or Medicine. However, we believe that the Nobel Committee should also have acknowledged the seminal contributions of immunologists Charles A. Janeway Jr (1943–2003) and Ruslan Medzhitov.

Janeway laid out the major theory that unifies the principles of innate and adaptive immunity (C. A. Janeway *Cold Spring Harb. Symp. Quant. Biol.* **54**, 1–13; 1989), later

experimentally verified with Medzhitov and then by many others. He recognized that antigen alone is insufficient to elicit an adaptive immune response, and postulated that both primitive and higher animals have specialized 'pattern-recognition receptors' that induce the innate immune response when activated by a particular class of conserved microbial products ('pathogen-associated molecular patterns').

The most important tenet of his theory was the connection between innate immune signalling and initiation of the adaptive immune response through enhancement of antigen processing and presentation, induction of co-stimulatory signals and cytokine release.

Medzhitov and Janeway subsequently cloned a human 'Toll-like' receptor and showed that it activated signalling pathways that induce adaptive immunity (R. Medzhitov *et al.* *Nature* **388**, 394; 1997). This remarkable demonstration also provided a framework for interpreting the significance of Toll-like receptors and their ligands for the immune response.

The innate–adaptive connection is now a fundamental principle in

immunology. We believe that the work of Janeway and Medzhitov was a Nobel-standard breakthrough for immunology.

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## Nobels: maintaining Israel's record

Israeli science has done well in the past decade of Nobel prize awards, with five nominations to three leading institutions — or 0.77 laureates per million people (compared with 0.2 for the United States, for example). This is despite the country's tiny population and the fact that it is the world's leading exporter of brainpower. But more investment in education and research will be necessary to maintain this impressive record.

One-quarter of Israel's academic scholars work at leading academic institutions in the United States — five times more than from any other nation apart from Canada (just over 12%; see [go.nature.com/xen9nws](http://go.nature.com/xen9nws)).

Since 1973, the proportion of scientists in the population and the government's investment in academia relative to gross domestic product have both dropped by more than half, putting Israel below the average for countries within the Organisation for Economic Co-operation and Development (see [go.nature.com/vozwgh](http://go.nature.com/vozwgh)).

Another problem is that the ultra-orthodox education system — which is responsible for more than one-quarter of Israel's first-graders (from age six) — does not

teach science or mathematics.

But there is hope for the future. As shown by the ongoing demonstrations for social justice, one of which was estimated to involve 7% of Israel's Jewish population, activism is already leading to short- and long-term changes, including a drive for more investment at all levels of education.

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## Nobels: fundamental biology misses out

In 1895, Alfred Nobel bequeathed much of his immense fortune to create the five original Nobel prizes — for literature, physiology or medicine, physics, chemistry, and peace. The award categories were expanded to include economics in 1968, following a large donation to the Nobel Foundation on behalf of the Swedish central bank, by the creation of the Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel.

The symbolic recognition of the work of Nobel laureates increases awareness of scientific research in the eyes of the public. It is a continuing shame that fundamental biology — and not just its application in medicine — lacks such a patron.

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## Tropical forests: still vital when degraded

Luke Gibson *et al.* argue that tropical conservation efforts should focus on primary and selectively logged forests, because these are the most diverse (*Nature* **478**, 378–381; 2011). However, working in degraded habitats can also provide important conservation opportunities.

Worldwide, around 500,000 hectares of logged and secondary forests are converted every year to plantations such as oil palm, rubber, *Acacia* and *Eucalyptus*, reducing both their current biodiversity value and their capacity for regeneration. Because of the revenue they generate, conserving such forests may be more economically viable than the total protection of pristine forests.

Disturbed forests include important 'matrix habitats' between areas of intact forest that can buffer against the impact of habitat fragmentation on reserves. Species occupancy of protected areas is more strongly associated with the condition of the matrix than with either reserve size or isolation (L. R. Prugh *et al.* *Proc. Natl Acad. Sci. USA* **105**, 20770–20775; 2008). Such forests also provide crucial habitat for wide-ranging species.

In many parts of the tropics, primary forests are confined to upland areas or to poor soils, and are biogeographically restricted. It may be more productive to focus on restoring degraded, but endangered, lowland habitats than on protecting yet more upland forest.

Another consideration is that hunting in tropical reserves significantly threatens their long-term viability. Protection of wildlife may be better achieved through working with timber or oil concessions, or in buffer-zone tourist reserves, than with cash-strapped (or otherwise compromised) nature-reserve agencies.

Tropical reserves cover roughly 11% of the tropical forest biome, whereas 40% is deforested, 20% is logged and an unknown but significant proportion of the remainder is severely degraded (S. J. Wright *Annals New York Acad. Sci.* **1195**, 1–27; 2010). Such figures alone make it necessary to consider the protection of biodiversity in