IN BRIEF

INFLAMMASOME

Inflammasome is involved in parasite resistance

This study identifies a role for the NLRP3 (NOD-, LRR- and pyrin domain-containing 3) inflammasome in triggering the production of nitric oxide (NO), which is necessary for host resistance to *Leishmania* parasites. First, it was shown that infection of bone marrow-derived macrophages (BMDMs) with *Leishmania amazonensis* induces caspase 1 activation and high levels of interleukin-1β (IL-1β) production. These effects were dependent on the presence of key inflammasome components (the adaptor protein ASC, caspase 1 and NLRP3) and potassium efflux, which is required for NLRP3 inflammasome activation. Second, it was shown that BMDMs that lack functional NLRP3 inflammasomes or that are deficient in inducible nitric oxide synthase 2 (NOS2) fail to restrict the intracellular replication of *L. amazonensis*. The assessment of skin lesions caused by *L. amazonensis* infection in various inflammasome-deficient mouse strains confirmed a key role for the NLRP3 inflammasome in controlling parasite load *in vivo*. Finally, signalling through the IL-1 receptor was shown to link the inflammasome-driven production of IL-1β to the NOS2-mediated production of NO for effective host resistance.

ORIGINAL RESEARCH PAPER Lima-Junior, D. S. *et al.* Inflammasome-derived IL-1β production induces nitric oxide-mediated resistance to *Leishmania*. *Nature Med.* **19**, 909–915 (2013)

OSTEOIMMUNOLOGY

The CD27–CD70 axis in osteoclast development

The engagement of CD70 on dendritic cells (DCs) and lymphocytes by CD27 sustains immune activation. Here, the CD27–CD70 axis is shown to also impede osteoclast development in the bone marrow. *Cd27*$^{+/-}$ mice that constitutively express a *Cd70* transgene on DCs had increased trabecular bone mass compared with *Cd27*$^{+/+}$ mice because of defective osteoclast differentiation. Osteoclast progenitors could be classified into a CD27^{hi} subset, which could generate both osteoclasts and DCs, and a CD27^{low} subset, which was fully commited to the osteoclast lineage. Constitutive CD70 signalling skewed osteoclast progenitors towards DC differentiation, which led to the defective development of osteoclasts. It will be interesting to assess whether chronic immune activation (including constitutive CD70 signalling) also affects the function of other haematopoietic progenitor cells in the bone marrow.

ORIGINAL RESEARCH PAPER Xiao, Y. *et al.* Osteoclast precursors in murine bone marrow express CD27 and are impeded in osteoclast development by CD70 on activated immune cells. *Proc. Natl Acad. Sci. USA* http://dx.doi.org/10.1073/pnas.1216082110 (2013)

T CELL MEMORY

Right time, right place for protection

Owing to their limited proliferative capacity and poor long-term survival, the CD27^{low}KLRG1^{hi} subset of effector memory CD8^{+} T cells was assumed to have a small role in protection against secondary infections. Now, it has been shown that these cells in fact have a potent cytotoxic capacity and a distinct localization in the red pulp of the spleen, where they provide effective protection against secondary challenge with *Listeria monocytogenes* or vaccinia virus. The KLRG1^{hi} population form the main secondary memory cell subset following antigen-specific boosting and are optimally placed to engage with invading pathogens. This study suggests that the composition and the location of CD8^{+} T cell populations might be the best predictors of vaccine efficacy.

ORIGINAL RESEARCH PAPER Olson, J. A. *et al.* Effector-like CD8^{+} T cells in the memory population mediate potent protective immunity. *Immunity* **38**, 1250–1260 (2013)