Immunologic Response to *Angiostrongylus cantonensis*

William L. Gosnell, Ph.D.
Kenton J. Kramer, Ph.D.
Dept. of Tropical Medicine
JABSOM
Univ. of Hawai‘i @ Mānoa
Eosinophilic Meningitis

- Most common clinical presentation of *A. cantonensis*
  - Defined as the presence of >10 eosinophils/µl in CSF or at least 10% eosinophils in the total CSF leukocyte count.
  - Eosinophils are not normally found in the CSF.
- Eosinophilic inflammatory response to parasite.
Initiation of Response

- First response to parasite is in the GI tract.
  - Larvae comes into contact with a number of immune cells located in the submucosa.
  - Local lymph node involvement.
Recognition

- Pattern recognition receptors (PRR)
  - Respond to pathogen-associated molecular patterns (PAMP) and
  - endogenous stress signals termed danger-associated molecular patterns (DAMP).

Cell Microbiol. 2008 Sep;10(9):1757-64
T Helper 2 (TH2) Directed Response

**TH2-cell Functions in Helminth Infections**

Nature Reviews Immunology 7, 975-987 (Dec 2007)
Antihelminth Mechanisms

- Classic repertoire of cells and molecules
  - Eosinophils
  - Activated macrophages
  - Basophils
    - Neutrophils
  - IgE
    - IgM

Eosinophil Function

- Antihelminth responses include release of host proteases and potentially lethal attack with reactive nitrogen and oxygen intermediates (NO and H$_2$O$_2$) by eosinophils and other cells.

Nat Rev Immunol. 2003 Sep;3(9):733-44
Parasites migrate from area of immune ‘first contact’ (the gut) to CNS
Cytokines in Neuronal Injury

- Cytokines can be expressed by numerous cell types and can have actions on many aspects of central nervous system function that might contribute to or limit subsequent neuronal injury.

Nature Reviews | Neuroscience

Summary

- Proinflammatory cytokines play an important role in the host defense against *Angiostrongylus* infection however, if unregulated they can cause severe pathology and inflict more harm upon the host than the helminth itself.