**A framework of host immune responses against four types of parasitic infections**

Running title: Immunity against parasites

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**Abstract**
Host immunity against parasitic infections are complicated. It will be categorized into four immunological pathways against four types of parasitic infections. For intracellular protozoa, the host immunological pathway is TH1 immunity with macrophages, IFNg CD4 T cells, CD8 T cells, and IgG3 B cells. For free living extracellular protozoa, the host immunological pathway is TH22 immunity with neutrophils, IL-22/IL-17 CD4 T cells, and IgG2 B cells. For helminths (endoparasites), the host immunological pathway is TH2a immunity with eosinophils, IL-5/IL-4 CD4 T cells, and IgG4 B cells. For insects (ectoparasites), the host immunological pathway is TH2b immunity with basophils, mast cells, IL-3/IL-4 CD4 T cells, and IgE B cells. Thus, the framework of the whole immunological pathways against four types of parasitic infection is given.

Key words: TH1, TH2, TH17, eosinophils, basophils, protozoa, helminths, insects

## Introduction

Host immunological pathways against parasitic infections are complicated. Parasites include protozoa, helminths, and insects. Here, I am proposing a new framework of host immunological pathways for the four types of parasitic infections.

## Intracellular protozoa and TH1 immunity

For intracellular protozoa, the host immunological pathway is TH1 immunity with macrophages, IFNg CD4 T cells, CD8 T cells, and IgG3 B cells.

## Extracellular protozoa and TH22 immunity

For free living extracellular protozoa, the host immunological pathway is TH22 immunity with neutrophils, IL-22/IL-17 CD4 T cells, and IgG2 B cells.

## Helminths (endoparasites) and TH2a immunity

For helminths (endoparasites), the host immunological pathway is TH2a immunity with eosinophils, IL-5/IL-4 CD4 T cells, and IgG4 B cells.

## Insects (ectoparasites) and TH2b immunity

For insects (ectoparasites), the host immunological pathway is TH2b immunity with basophils, mast cells, IL-3/IL-4 CD4 T cells, and IgE B cells.

## Conclusion

Thus, the framework of the whole immunological pathways against four types of parasitic infection is given.