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Research and Professional Experience

Our current research focuses on the characterization of the cellular and molecular mechanisms underlying the induction of protective T-cell mediated immunity against malaria parasites. We generated strains of transgenic mice bearing T cell receptors specific for parasite antigens recognized by CD8⁺ or CD4⁺ T cells. Using these mice, we are currently conducting studies to characterize the molecular and genetic events involved in the development and maintenance of effector anti-parasite T cells, and the mechanisms by which CD4⁺ /CD8⁺ T cells interact during the development of immunity against infection. Our research combines in vivo immunophysiology studies together with molecular and genetic approaches. Particular emphasis is given to research aimed at characterizing the mechanisms involved in tissue-trafficking of activated CD8⁺ T cells and identifying the nature of the molecular processes leading to the development of memory subsets.

These studies using a rodent parasite system provides the rationale and experimental basis for research aimed at developing an anti-malaria vaccine for humans. Furthermore, these rodent models are excellent systems for studying the general principles of protective immunity against intracellular pathogens, as they develop in vivo. These studies enhance our understanding of the immune system at the most fundamental level.

Honors and Awards

SELECTED PUBLICATIONS OF THE LAST SEVEN YEARS

Overstreet MG, Freyberger H, Cockburn I. A., Chen Y.C, Tse, S.W. and Fidel Zavala (2009) CpG-enhanced CD8⁺ T cell responses to peptide immunization are severely inhibited by B cells. *Eur J Immunol* Oct 14;40(1):124-133. [Epub ahead of print]

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Li S, Locke E, Bruder J, Clarke D, Doolan DL, Havenga MJ, Hill AV, Liljestrom P, Monath TP, Naim HY, Ockenhouse C, Tang DC, Van Kampen KR, Viret JF, Zavala F, Dubovsky F. 2007 Viral vectors for malaria vaccine development. *Vaccine*. 25:2567-74

Kumar K A, Sano GI, Boscardin S, Nussenzweig RS, Nussenzweig MC, Zavala F and Nussenzweig V. 2006 The circumsporozoite protein is an immunodominant protective antigen in irradiated sporozoites. *Nature* 444 (7121):937-40

Hafalla JC, Urvashi Rai, Alexandre Morrot, Dabeiba Bernal-Rubio, Fidel Zavala and Ana Rodriguez. 2006 Priming of CD8+ T cell responses following immunization with heat-killed *Plasmodium* sporozoites. *Eur. J Immunol* 36:1179-86.

Morrot A, Ian A. Cockburn, Michael Overstreet, Dolores Rodríguez and Fidel Zavala. 2006. Protective CD8+ T cells induced by malaria sporozoites do not undergo modulation of IL-7 receptor expression. *Infect. Immun.* 74: 2495-2497

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Zavala F., Rodrigues M., Rodriguez D. Rodriguez J.R., Nussenzweig R.S., and Esteban M. 2001. A striking property of recombinant poxviruses: efficient inducers of in vivo expansion of primed CD8+ T cells. *Virology* 280: 55-159