Professor Colby Zaph

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OTHER PROGRAM AFFILIATIONS

Cancer

Development and Stem Cells

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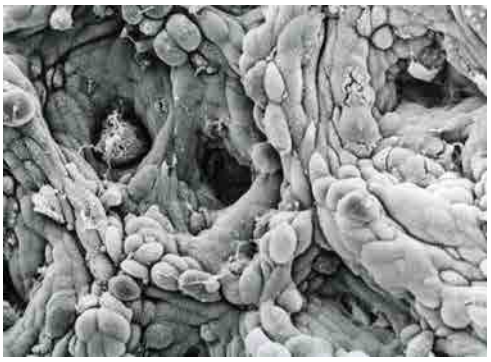
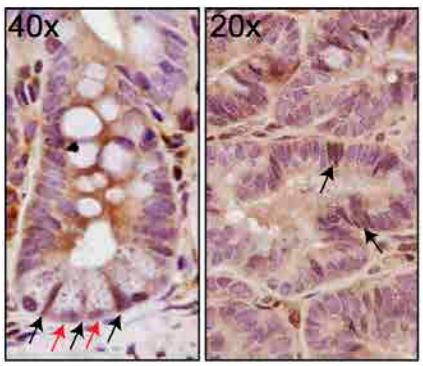
The overarching goal of research in our lab is to define the cellular and molecular mechanisms that control immunity and inflammation at mucosal sites such as the intestine and the lung. The various subsets of immune and non-immune cells at mucosal sites are present in a tightly controlled equilibrium that when perturbed by infection, chemicals or genetic predisposition, results in dysregulated inflammation and diseases including asthma and allergy, inflammatory bowel diseases (IBDs), food allergies and cancer. Understanding the molecular and cellular principles underlying mucosal inflammation represents a potential target for identifying novel therapeutics for the treatment of these diseases.

Research Projects

1. **Epigenetic regulation of mucosal immunity and inflammation**
2. **Retinoic acid, Hic1 and intestinal immune homeostasis**
3. **Methylation is the new phosphorylation: Dynamic regulation of signal transduction by methylation**



Scanning electron micrograph of large intestine.



Histological section of normal (L) and cancerous (R) large intestinal tissue.

Selected significant publications:

1. Barsyte-Lovejoy D, Li F, Oudhoff MJ, Tatlock JH, Dong A, Zeng H, Wu H, Freeman SA, Schapira M, Senisterra GA, Kuznetsova E, Marcellus R, Allali-Hassani A, Kennedy S, Lambert J-P, Couzens AL, Aman A, Gingras A-C, Al-Awar R, Fish PV, Gerstenberger BS, Roberts L, Benn CL, Grimley RL, Braam MJS, Rossi FMV, Sudol M, Brown PJ, Bunnage ME, Owen DR, **Zaph C**, Vedadi M and Arrowsmith CH. 2014. (R)-PFI-2 is a potent and selective inhibitor of SETD7 methyltransferase activity in cells. *Proc. Natl. Acad. Sci U.S.A.* 111, 12853–12858
2. Oudhoff MJ, Freeman SA, Couzens AL Antignano F, Min PH, Northrop JP, Burrows K, Chenery A, Lehnertz B, Barsyte-Lovejoy D, Vedadi M, Arrowsmith CH, Nishina H, Gold MR, Rossi FMV, Gingras A-C, **Zaph C**. 2013. Regulation of the Hippo pathway through Set7-dependent methylation of Yap. *Dev. Cell.* 26, 188–194
3. Antignano F, Burrows K, Hughes ML, Han JM, Kron KJ, Penrod, NM, Oudhoff MJ, Wang SKH, Min PH, Gold MJ, Chenery A, Braam MJS, Fung TC, Rossi FMV, McNagny KM, Arrowsmith CH, Lupien M, Levings MK, **Zaph C**. 2013. Methyltransferase G9A regulates T cell differentiation during murine intestinal inflammation. *J. Clin. Invest.* 124, 1945–1955
4. Hadidi S, Antignano F, Hughes ML, Wang SKH, Snyder K, Sammis GM, Kerr WG, McNagny KM, **Zaph C**. 2012. Myeloid cell-specific expression of Ship1 regulates IL-12 production and immunity to helminth infection. *Mucosal Immunol.* 5, 535–543
5. Lehnertz B, Northrop JP, Antignano F, Burrows K, Hadidi S, Mullaly SC, Rossi FMV, **Zaph C**. 2010. Activating and inhibitory functions for the histone lysine methyltransferase G9a in T helper cell differentiation and function. *J. Exp. Med*. 207, 915–922