

## Sara Michie

Professor of Pathology (Research), Emerita

### Bio

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#### ACADEMIC APPOINTMENTS

- Emeritus Faculty, Acad Council, Pathology
- Member, Bio-X

#### HONORS AND AWARDS

- Henry J. Kaiser Award for Excellence in Preclinical Teaching, Stanford Medical School (1998)

### Research & Scholarship

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#### CURRENT RESEARCH AND SCHOLARLY INTERESTS

Our laboratory studies the molecular mechanisms that control the migration of lymphocytes into sites of autoimmune-mediated tissue damage, such as pancreatic islets in type 1 diabetes and salivary glands in Sjogren's syndrome. Our long-term goals include better understanding of the pathogenesis of autoimmune diseases, and development of novel diagnostic and therapeutic strategies.

### Teaching

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#### GRADUATE AND FELLOWSHIP PROGRAM AFFILIATIONS

- Immunology (Phd Program)

### Publications

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#### PUBLICATIONS

- **Mucosal Addressin Cell Adhesion Molecule-1 Mediates T Cell Migration into Pancreas-Draining Lymph Nodes for Initiation of the Autoimmune Response in Type 1 Diabetes.** *International journal of molecular sciences*  
Li, Y., Gunderson, R. C., Xu, Z., Ai, W., Shen, F., Ye, J., Xu, B., Michie, S. A.  
2024; 25 (21)
- **LFA-1/ICAM-1 Adhesion Pathway Mediates the Homeostatic Migration of Lymphocytes from Peripheral Tissues into Lymph Nodes through Lymphatic Vessels.** *Biomolecules*  
Guo, J., Xu, Z., Gunderson, R. C., Xu, B., Michie, S. A.  
2023; 13 (8)
- **Expanding the spectrum of Kabuki syndrome with novel neuropathological, ocular and genetic findings in an autopsy case**  
Cayrol, R., Ahmadian, S., Michie, S., Lin, J., Born, D.  
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- **Inhibition of VEGF (Vascular Endothelial Growth Factor)-A or its Receptor Activity Suppresses Experimental Aneurysm Progression in the Aortic Elastase Infusion Model.** *Arteriosclerosis, thrombosis, and vascular biology*  
Xu, B., Iida, Y., Glover, K. J., Ge, Y., Wang, Y., Xuan, H., Hu, X., Tanaka, H., Wang, W., Fujimura, N., Miyata, M., Shoji, T., Guo, et al  
2019: ATVBAHA119312497
- **Hypoxia-inducible factor 1 in clinical and experimental aortic aneurysm disease** *JOURNAL OF VASCULAR SURGERY*

- Wang, W., Xu, B., Xuan, H., Ge, Y., Wang, Y., Wang, L., Huang, J., Fu, W., Michie, S. A., Dalman, R. L.  
2018; 68 (5): 1538-+
- **Hypoxia-inducible factor 1 in clinical and experimental aortic aneurysm disease.** *Journal of vascular surgery*  
Wang, W., Xu, B., Xuan, H., Ge, Y., Wang, Y., Wang, L., Huang, J., Fu, W., Michie, S. A., Dalman, R. L.  
2017
  - **Human hepatic organoids for the analysis of human genetic diseases** *JCI INSIGHT*  
Guan, Y., Xu, D., Garfin, P. M., Ehmer, U., Hurwitz, M., Enns, G., Michie, S., Wu, M., Zheng, M., Nishimura, T., Sage, J., Peltz, G.  
2017; 2 (17)
  - **Human hepatic organoids for the analysis of human genetic diseases.** *JCI insight*  
Guan, Y., Xu, D., Garfin, P. M., Ehmer, U., Hurwitz, M., Enns, G., Michie, S., Wu, M., Zheng, M., Nishimura, T., Sage, J., Peltz, G.  
2017; 2 (17)
  - **Angiotensin 1-7 Suppresses Experimental Abdominal Aortic Aneurysms**  
Li, G., Xu, B., Deng, H., Cabot, A., Yuan, H., Wu, X., Michie, S. A., Dalman, R. L.  
MOSBY-ELSEVIER.2017: 198S–199S
  - **Inhibition or deletion of angiotensin II type 1 receptor suppresses elastase-induced experimental abdominal aortic aneurysms.** *Journal of vascular surgery*  
Xuan, H., Xu, B., Wang, W., Tanaka, H., Fujimura, N., Miyata, M., Michie, S. A., Dalman, R. L.  
2017
  - **A silk-based encapsulation platform for pancreatic islet transplantation improves islet function in vivo** *JOURNAL OF TISSUE ENGINEERING AND REGENERATIVE MEDICINE*  
Hamilton, D. C., Shih, H. H., Schubert, R. A., Michie, S. A., Staats, P. N., Kaplan, D. L., Fontaine, M. J.  
2017; 11 (3): 887-895
  - **ICAM-1 Promotes Experimental Aortic Aneurysms Through Recruitment of Circulating Leukocytes**  
Xu, B., Iida, Y., Xuan, H., Li, S., Fujimura, N., Michie, S. A., Dalman, R. L.  
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  - **Diagnostic Dilemma in the Treatment of a Fatal Case of Bloody Diarrhea.** *Journal of investigative medicine high impact case reports*  
Mahapatra, S., Michie, S. A., Sylvester, K., Cornfield, D.  
2016; 4 (1): 2324709616638698-?
  - **Does Metformin Suppress Aneurysmal Aortic Degeneration?**  
Xu, B., Kettler, E., Xiong, J., Fujimura, N., Xuan, H., Glover, K. J., Michie, S. A., Mell, M. W., Dalman, R. L.  
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  - **Humanized Thymidine Kinase-NOG Mice Can Be Used to Identify Drugs That Cause Animal-Specific Hepatotoxicity: A Case Study with Furosemide** *JOURNAL OF PHARMACOLOGY AND EXPERIMENTAL THERAPEUTICS*  
Xu, D., Michie, S. A., Zheng, M., Takeda, S., Wu, M., Peltz, G.  
2015; 354 (1): 73-78
  - **Immune Modulator FTY720 Suppresses Experimental Abdominal Aortic Aneurysms**  
Fujimura, N., Xu, B., Xuan, H., Xiong, J. J., Deng, H., Michie, S. A., Dalman, R. L.  
MOSBY-ELSEVIER.2015: 171S–172S
  - **Chimeric TK-NOG Mice: A Predictive Model for Cholestatic Human Liver Toxicity.** *journal of pharmacology and experimental therapeutics*  
Xu, D., Wu, M., Nishimura, S., Nishimura, T., Michie, S. A., Zheng, M., Yang, Z., Yates, A. J., Day, J. S., Hillgren, K. M., Takeda, S. T., Guan, Y., Guo, et al  
2015; 352 (2): 274-280
  - **A silk-based encapsulation platform for pancreatic islet transplantation improves islet function in vivo.** *Journal of tissue engineering and regenerative medicine*  
Hamilton, D. C., Shih, H. H., Schubert, R. A., Michie, S. A., Staats, P. N., Kaplan, D. L., Fontaine, M. J.  
2015

- **VCAM-1/alpha 4 beta 1 Integrin Interaction Is Crucial for Prompt Recruitment of Immune T Cells into the Brain during the Early Stage of Reactivation of Chronic Infection with *Toxoplasma gondii* To Prevent Toxoplasmic Encephalitis** *INFECTION AND IMMUNITY*  
Sa, Q., Ochiai, E., Sengoku, T., Wilson, M. E., Brogli, M., Crutcher, S., Michie, S. A., Xu, B., Payne, L., Wang, X., Suzuki, Y.  
2014; 82 (7): 2826-2839
- **Propagermanium, a CCR2 Signaling Inhibitor, Suppresses Monocyte Mobilization and Migration in Experimental Aneurysms**  
Fujimura, N., Xu, B., Xuan, H., Dalman, J., Furusho, Y., Tanaka, H., Glover, K., Rouer, M., Aoyama, K., Michie, S. A., Dalman, R. L.  
MOSBY-ELSEVIER.2014: 81S–82S
- **CCR7 directs the recruitment of T cells into inflamed pancreatic islets of nonobese diabetic (NOD) mice.** *Immunologic research*  
Shan, Z., Xu, B., Mikulowska-Mennis, A., Michie, S. A.  
2014; 58 (2-3): 351-357
- **Fialuridine Induces Acute Liver Failure in Chimeric TK-NOG Mice: A Model for Detecting Hepatic Drug Toxicity Prior to Human Testing.** *PLoS medicine*  
Xu, D., Nishimura, T., Nishimura, S., Zhang, H., Zheng, M., Guo, Y., Masek, M., Michie, S. A., Glenn, J., Peltz, G.  
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Xu, D., Nishimura, T., Nishimura, S., Zhang, H., Zheng, M., Guo, Y., Masek, M., Michie, S. A., Glenn, J., Peltz, G.  
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- **Enabling Autologous Human Liver Regeneration With Differentiated Adipocyte Stem Cells** *CELL TRANSPLANTATION*  
Xu, D., Nishimura, T., Zheng, M., Wu, M., Su, H., Sato, N., Lee, G., Michie, S., Glenn, J., Peltz, G.  
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- **Protein polymer hydrogels: Effects of endotoxin on biocompatibility.** *Journal of biomaterials applications*  
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2013; 28 (3): 395-406
- **VCAM-1/alpha 4 beta 1 integrin interaction is important for T cell recruitment to prevent reactivation of chronic infection with *Toxoplasma gondii* in the brain**  
Sa, Q., Michie, S., Xu, B., Payne, L., Wang, X., Suzuki, Y.  
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- **Text-mining applied to autoimmune disease research: the Sjogren's syndrome knowledge base** *BMC MUSCULOSKELETAL DISORDERS*  
Gorr, S., Wennblom, T. J., Horvath, S., Wong, D. T., Michie, S. A.  
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- **Systems analysis of primary Sjogren's syndrome pathogenesis in salivary glands identifies shared pathways in human and a mouse model** *ARTHRITIS RESEARCH & THERAPY*  
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- **Systems analysis of primary Sjogren's syndrome pathogenesis in salivary glands identifies shared pathways in human and a mouse model.** *Arthritis research & therapy*  
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- **The immunoglobulin heavy chain gene 3' enhancers induce Bcl2 deregulation and lymphomagenesis in murine B cells** *LEUKEMIA*  
Xiang, H., Noonan, E. J., Wang, J., Duan, H., Ma, L., Michie, S., Boxer, L. M.  
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- **alpha(4)beta(7) integrin/MAdCAM-1 adhesion pathway is crucial for B cell migration into pancreatic lymph nodes in nonobese diabetic mice** *JOURNAL OF AUTOIMMUNITY*  
Xu, B., Cook, R. E., Michie, S. A.  
2010; 35 (2): 124-129

- **Removal of *Toxoplasma gondii* Cysts from the Brain by Perforin-Mediated Activity of CD8(+) T Cells** *AMERICAN JOURNAL OF PATHOLOGY*  
Suzuki, Y., Wang, X., Jortner, B. S., Payne, L., Ni, Y., Michie, S. A., Xu, B., Kudo, T., Perkins, S.  
2010; 176 (4): 1607-1613
- **Removal of *Toxoplasma gondii* cysts from the brain by perforin-mediated activity of CD8+T cells**  
Suzuki, Y., Wang, X., Jortner, B., Payne, L., Ni, Y., Michie, S., Xu, B., Kudo, T., Perkins, S.  
AMER ASSOC IMMUNOLOGISTS.2010
- **PPAR-delta senses and orchestrates clearance of apoptotic cells to promote tolerance** *NATURE MEDICINE*  
Mukundan, L., Odegaard, J. I., Morel, C. R., Heredia, J. E., Mwangi, J. W., Ricardo-Gonzalez, R. R., Goh, Y. P., Eagle, A. R., Dunn, S. E., Awakuni, J. U., Nguyen, K. D., Steinman, L., Michie, et al  
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- **Expression of endothelia and lymphocyte adhesion molecules in bronchus-associated lymphoid tissue (BALT) in adult human lung** *RESPIRATORY RESEARCH*  
Kawamata, N., Xu, B., Nishijima, H., Aoyama, K., Kusumoto, M., Takeuchi, T., Tei, C., Michie, S. A., Matsuyama, T.  
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- **Targeting tumor-associated macrophages in an experimental glioma model with a recombinant immunotoxin to folate receptor beta** *CANCER IMMUNOLOGY IMMUNOTHERAPY*  
Nagai, T., Tanaka, M., Tsuneyoshi, Y., Xu, B., Michie, S. A., Hasui, K., Hirano, H., Arita, K., Matsuyama, T.  
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- **Systems Biology Analysis of Sjogren's Syndrome and Mucosa-Associated Lymphoid Tissue Lymphoma in Parotid Glands** *ARTHRITIS AND RHEUMATISM*  
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- **The LFA-1 and ICAM-1 adhesion pathway mediates the homeostatic migration of lymphocytes from peripheral tissues through lymphatic vessels into lymph nodes**  
Xu, B., Xu, Z., Cook, R. E., Michie, S. A.  
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- **Lack of lymphoid chemokines CCL19 and CCL21 enhances allergic airway inflammation in mice** *INTERNATIONAL IMMUNOLOGY*  
Xu, B., Aoyama, K., Kusumoto, M., Matsuzawa, A., Butcher, E. C., Michie, S. A., Matsuyama, T., Takeuchi, T.  
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- **Importance of IFN-gamma-mediated expression of endothelial VCAM-1 on recruitment of CD8(+) T cells into the brain during chronic infection with *Toxoplasma gondii*** *JOURNAL OF INTERFERON AND CYTOKINE RESEARCH*  
Wang, X., Michie, S. A., Xu, B., Suzuki, Y.  
2007; 27 (4): 329-338
- **Regulation of hormone-sensitive lipase in islets** *DIABETES RESEARCH AND CLINICAL PRACTICE*  
Shen, W., Liang, Y., Wang, J., Harada, K., Patel, S., Michie, S. A., Osuga, J., Ishibashi, S., Kraemer, F. B.  
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- **Contact sensitizer potassium dichromate alters lymphocyte populations in draining lymph nodes and blood in mice** *TOXICOLOGY MECHANISMS AND METHODS*  
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- **Protein phosphatase-2A associates with and dephosphorylates keratin 8 after hyposmotic stress in a site- and cell-specific manner** *JOURNAL OF CELL SCIENCE*  
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- **Keratin 8 overexpression promotes mouse Mallory body formation** *JOURNAL OF CELL BIOLOGY*  
Nakamichi, I., Toivola, D. M., Strnad, P., Michie, S. A., Oshima, R. G., Baribault, H., Omary, M. B.  
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- **The role of TNF-alpha in the pathogenesis of type 1 diabetes in the nonobese diabetic mouse: Analysis of dendritic cell maturation** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*  
Lee, L. F., Xu, B. H., Michie, S. A., Beilhack, G. F., Warganich, T., Turley, S., McDevitt, H. O.  
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- **Absence of the major zymogen granule membrane protein, GP2, does not affect pancreatic morphology or secretion** *JOURNAL OF BIOLOGICAL CHEMISTRY*  
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- **Keratin 8 and 18 overexpression is not a prerequisite for Mallory body formation and pancreatic injury**  
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*AMER SOC CELL BIOLOGY*.2004: 172A
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- **Keratin-8 null mice have different gallbladder and liver susceptibility to lithogenic diet-induced injury** *JOURNAL OF CELL SCIENCE*  
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- **Engagement of the lymphotoxin-beta receptor is required for development of diabetes in non-obese diabetic mice.**  
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- **Keratin binding to 14-3-3 proteins modulates keratin filaments and hepatocyte mitotic progression** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*  
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- **Lymphocyte migration to is mediated by vascular inflamed lacrimal glands cell adhesion molecule-1/alpha(4)beta(1) integrin, peripheral node addressin/L-selectin, and lymphocyte function-associated antigen-1 adhesion pathways** *AMERICAN JOURNAL OF PATHOLOGY*  
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- **Inhibition of 14-3-3 binding to keratins alters mitotic progression and protects from hepatotoxic injury**  
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Toivola, D. M., Michie, S. A., Ku, N. O., Omary, M. B.  
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- **Effects of tumor necrosis factor and lymphotoxin on peripheral lymphoid tissue development** *INTERNATIONAL IMMUNOLOGY*  
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- **Adhesion molecule phenotype of T lymphocytes in inflamed CNS** *JOURNAL OF NEUROIMMUNOLOGY*  
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