Stanford

Keith Van Haren, MD

Assistant Professor of Neurology and of Pediatrics at the Stanford University Medical Center

Neurology & Neurological Sciences

CLINICAL OFFICES

- **Child Neurology**

  730 Welch Rd Ste 206

  Palo Alto, CA 94304

  Tel (650) 723-0993 **Fax** (650) 721-6350

Bio

CLINICAL FOCUS

- Leukodystrophies
- Autoimmune Diseases of the Nervous System
- Neurology - Child Neurology

ACADEMIC APPOINTMENTS

- Assistant Professor - Med Center Line, Neurology & Neurological Sciences
- Assistant Professor - Med Center Line, Pediatrics
- Member, Maternal & Child Health Research Institute (MCHRI)

HONORS AND AWARDS

- Inductee, Arnold Gold Humanism Honor Society (2004)
- Commencement Speaker, University of Rochester School of Medicine (2005)
- Medical Student Teaching Award, Stanford Dept Neurology (2009-2010)
- Chief Resident, Stanford Dept Neurology (2009-2010)
- Moore Award, Honorable Mention, American Association of Neuropathology (2003)
- PERF-CNF Scientific Award, Child Neurology Foundation (2011)

BOARDS, ADVISORY COMMITTEES, PROFESSIONAL ORGANIZATIONS

- Founding Member, ALD Connect (2014 - present)
- Founding Member, The Global Leukodystrophy Initiative (GLIA) (2014 - present)

PROFESSIONAL EDUCATION

- BA, College of the Holy Cross , Chemistry (1999)
- MD, University of Rochester School of Medicine , Medicine (2005)
- PGY1-2 Pediatrics, Massachusetts General Hospital , Pediatrics (2007)

- PGY3-5 Neurology, Stanford University Hospitals & Clinics , Child & Adult Neurology (2010)
- Board Certification: Neurology - Child Neurology, American Board of Psychiatry and Neurology (2010)
- Post-doc, Steinman & Robinson Labs, Stanford University , Neuroimmunology (2014)

LINKS

- The VH Lab at Stanford: http://med.stanford.edu/van-haren-lab.html
- Get a Second Opinion: https://stanfordhealthcare.org/second-opinion/overview.html

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

Our lab explores the nexus of metabolic failure and inflammation. Our approach is unique. We leverage insights from neurologic disorders with known single-gene mutations to unravel the molecular mechanisms of human neuroinflammation.

Genetic disorders offer an unparalleled vantage point for understanding human biology. Immunogenetic are particularly unique because immune tissue is both accessible and modifiable. These disorders offer a unique window into basic molecular mechanisms and make exceptional targets for stem cell and gene therapies.

Our team's goals are to:

1. build foundational knowledge in human biology
2. develop transformational therapies for each disorder we study
3. train the next generation of translational scientists

Our team draws purpose and inspiration from children and adults affected by neurodegenerative disorders. We are particularly focused on genetic and autoimmune disorders that cause damage to the myelin (the fatty insulation around the nerves) of the brain and spinal cord. X-linked adrenoleukodystrophy (genetic) and multiple sclerosis (autoimmune) are the prototypical examples of degenerative disorders of myelin; these are the two disorders we study most intensively.

One of the great obstacles to understanding and treating MS is its pathological heterogeneity. MS is currently defined solely by clinical and radiological criteria. Although MS diagnostic criteria have improved over time, abundant evidence suggests that pathophysiologic "subtypes" of MS remain clinically indistinguishable. This pathophysiologic heterogeneity poses a major confounder to the development of new therapies. To combat this heterogeneity, we use ALD as a genetic model for MS.

ALD is a rare (~1:17,00), monogenetic, X-linked disorder involving a gene (ABCD1) that encodes a peroxisomal protein. The biochemical hallmark of the disease is an accumulation of very-long chain fatty acids in several tissues, including myelin and blood. The ABCD1 mutation yields a variety of neuroendocrine symptoms, but the most feared manifestation is an inflammatory cerebral demyelinating syndrome known as "cerebral ALD" that affects ~40% of ALD boys. The absence of a clear genotype-phenotype correlation for cerebral ALD suggests a role for environmental modifiers, similar to MS.

Despite the clinical and pathogenic similarities of MS and ALD, one question stands out: Why would a metabolic disorder like ALD yield a syndrome that so closely resembles MS, the prototypic neuroimmune disorder? This is the central questions animating our lab's current work.

CLINICAL TRIALS

- A Pilot Study of Vitamin D in Boys With X-linked Adrenoleukodystrophy, Recruiting

Publications

PUBLICATIONS

- **Safety and immunologic effects of high- vs low-dose cholecalciferol in multiple sclerosis.** *Neurology*
  Sotirchos, E. S., Bhargava, P., Eckstein, C., Van Haren, K., Baynes, M., Ntranos, A., Gocke, A., Steinman, L., Mowry, E. M., Calabresi, P. A.
  2016; 86 (4): 382-390

- **Acute Flaccid Myelitis of Unknown Etiology in California, 2012-2015** *JAMA-JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION*
  Van Haren, K., Ayscue, P., Waubant, E., Clayton, A., Sheriff, H., Yagi, S., Glenn-Finer, R., Padilla, T., Strober, J. B., Aldrovandi, G., Wadford, D. A., Chiu, C. Y., Xia, et al
  2015; 314 (24): 2663-2671

- **Serum autoantibodies to myelin peptides distinguish acute disseminated encephalomyelitis from relapsing- remitting multiple sclerosis.** *Multiple sclerosis (Houndmills, Basingstoke, England)*
  Van Haren, K., Tomooka, B. H., Kidd, B. A., Banwell, B., Bar-Or, A., Chitnis, T., Tenembaum, S. N., Pohl, D., Rostasy, K., Dale, R. C., O'Connor, K. C., Hafler, D. A., Steinman, et al
  2013; 19 (13): 1726-1733

- **Identification of Naturally Occurring Fatty Acids of the Myelin Sheath That Resolve Neuroinflammation** *SCIENCE TRANSLATIONAL MEDICINE*
  Ho, P. P., Kanter, J. L., Johnson, A. M., Srinagesh, H. K., Chang, E., Purdy, T. M., Van Haren, K., Wikoff, W. R., Kind, T., Khademi, M., Matloff, L. Y., Narayana, S., Hur, et al
  2012; 4 (137)

- **Acute Flaccid Myelitis of Unknown Etiology in California, 2012-2015.** *JAMA*
  Van Haren, K., Ayscue, P., Waubant, E., Clayton, A., Sheriff, H., Yagi, S., Glenn-Finer, R., Padilla, T., Strober, J. B., Aldrovandi, G., Wadford, D. A., Chiu, C. Y., Xia, et al
  ; 314 (24): 2663–71

- **Incidence, Risk Factors and Outcomes Among Children With Acute Flaccid Myelitis: A Population-based Cohort Study in a California Health Network Between 2011 and 2016** *PEDIATRIC INFECTIOUS DISEASE JOURNAL*
  Kane, M. S., Sonne, C., Zhu, S., Malhotra, A., Van Haren, K., Messacar, K., Glaser, C. A.
  2019; 38 (7): 667–72

- **Incidence, Risk Factors and Outcomes Among Children With Acute Flaccid Myelitis: A Population-based Cohort Study in a California Health Network Between 2011 and 2016.** *The Pediatric infectious disease journal*
  Kane, M. S., Sonne, C., Zhu, S., Malhotra, A., Van Haren, K., Messacar, K., Glaser, C. A.
  2019

- **Measuring early lesion growth in boys with cerebral demyelinating adrenoleukodystrophy.** *Neurology*
  van Haren, K., Engelen, M., Wolf, N.
  2019

- **Clinical Subpopulations in a Sample of North American Children Diagnosed With Acute Flaccid Myelitis, 2012-2016** *JAMA PEDIATRICS*
  Elrick, M. J., Gordon-Lipkin, E., Crawford, T. O., Van Haren, K., Messacar, K., Thornton, N., Dee, E., Voskertchian, A., Nance, J. R., Munoz, L. S., Gorman, M. P., Benson, L. A., Thomas, et al
  2019; 173 (2): 134–39

- **Clinical Subpopulations in a Sample of North American Children Diagnosed With Acute Flaccid Myelitis, 2012-2016.** *JAMA pediatrics*
  Elrick, M. J., Gordon-Lipkin, E., Crawford, T. O., Van Haren, K., Messacar, K., Thornton, N., Dee, E., Voskertchian, A., Nance, J. R., Munoz, L. S., Gorman, M. P., Benson, L. A., Thomas, et al
  2018

- **Safety, tolerability, and efficacy of fluoxetine as an antiviral for acute flaccid myelitis.** *Neurology*
  Messacar, K., Sillau, S., Hopkins, S. E., Otten, C., Wilson-Murphy, M., Wong, B., Santoro, J. D., Treister, A., Bains, H. K., Torres, A., Zabrocki, L., Glanternik, J. R., Hurst, et al
  2018

- **MRI Brain Abnormalities in Acute Flaccid Myelitis: Characteristics and Differentiation from Acute Disseminated Encephalomyelitis**
  Hopkins, S., Gordon-Lipkin, E., Van Haren, K., Santoro, J., Munoz-Arcos, L., Matesanz, S., Pardo-Villamizar, C., Banwell, B.

LIPPINCOTT WILLIAMS & WILKINS.2018

- **Pediatric Bickerstaff brainstem encephalitis: a systematic review of literature and case series** *JOURNAL OF NEUROLOGY*
  Santoro, J., Lazzareschi, D. V., Campen, C., Van Haren, K. P.
  2018; 265 (1): 141–50

- **Neonatal detection of Aicardi Goutieres Syndrome by increased C26:0 lysophosphatidylcholine and interferon signature on newborn screening blood spots** *MOLECULAR GENETICS AND METABOLISM*
  Armangue, T., Orsini, J. J., Takanohashi, A., Gavazzi, F., Conant, A., Ulrick, N., Morrissey, M. A., Nahhas, N., Helman, G., Gordish-Dressman, H., Orcesi, S., Tonduti, D., Stutterd, et al
  2017; 122 (3): 134–39

- **Postmortem Whole Exome Sequencing Identifies Novel EIF2B3 Mutation With Prenatal Phenotype in 2 Siblings** *JOURNAL OF CHILD NEUROLOGY*
  Song, H., Haeri, S., Vogel, H., van der Knaap, M., Van Haren, K.
  2017; 32 (10): 867–70

- **Revised consensus statement on the preventive and symptomatic care of patients with leukodystrophies** *MOLECULAR GENETICS AND METABOLISM*
  Adang, L. A., Sherbini, O., Ball, L., Bloom, M., Darbari, A., Amartino, H., DiVito, D., Eichler, F., Escolar, M., Evans, S. H., Fatemi, A., Fraser, J., Hollowell, et al
  2017; 122 (1-2): 18–32

- **Decision Making in Adrenoleukodystrophy: When Is a Good Outcome Really a Good Outcome?** *JAMA neurology*
  Van Haren, K., Engelen, M.
  2017

- **Arresting and Relapsing Cerebral Adrenoleukodystrophy, A Treatable Mimic of Multiple Sclerosis**
  Carlson, A. M., Huffnagel, I. C., Engelen, M., Van Haren, K.
  SAGE PUBLICATIONS LTD.2017: 27

- **Neonatal detection of Aicardi Goutières Syndrome by increased C26:0 lysophosphatidylcholine and interferon signature on newborn screening blood spots.** *Molecular genetics and metabolism*
  Armangue, T., Orsini, J. J., Takanohashi, A., Gavazzi, F., Conant, A., Ulrick, N., Morrissey, M. A., Nahhas, N., Helman, G., Gordish-Dressman, H., Orcesi, S., Tonduti, D., Stutterd, et al
  2017; 122 (3): 134–39

- **Acute flaccid myelitis: A clinical review of US cases 2012-2015.** *Annals of neurology*
  Messacar, K., Schreiner, T. L., Van Haren, K., Yang, M., Glaser, C. A., Tyler, K. L., Dominguez, S. R.
  2016; 80 (3): 326-338

- **Acute disseminated encephalomyelitis: Updates on an inflammatory CNS syndrome.** *Neurology*
  Pohl, D., Alper, G., Van Haren, K., Kornberg, A. J., Lucchinetti, C. F., Tenembaum, S., Belman, A. L.
  2016; 87 (9): S38-45

- **Magnetic Resonance Imaging Spectrum of Succinate Dehydrogenase-Related Infantile Leukoencephalopathy** *ANNALS OF NEUROLOGY*
  Helman, G., Caldovic, L., Whitehead, M. T., Simons, C., Brockmann, K., Edvardson, S., Bai, R., Moroni, I., Taylor, J. M., Van Haren, K., Taft, R. J., Vanderver, A., van der Knaap, et al
  2016; 79 (3): 379-386

- **Emerging Treatments for Pediatric Leukodystrophies** *PEDIATRIC CLINICS OF NORTH AMERICA*
  Helman, G., Van Haren, K., Escolar, M. L., Vanderver, A.
  2015; 62 (3): 649-?

- **A novel outbreak enterovirus D68 strain associated with acute flaccid myelitis cases in the USA (2012-14): a retrospective cohort study** *LANCET INFECTIOUS DISEASES*
  Greninger, A. L., Naccache, S. N., Messacar, K., Clayton, A., Yu, G., Somasekar, S., Federman, S., Stryke, D., Anderson, C., Yagi, S., Messenger, S., Wadford, D., Xia, et al
  2015; 15 (6): 671-682

- **Disease specific therapies in leukodystrophies and leukoencephalopathies** *MOLECULAR GENETICS AND METABOLISM*
  Helman, G., Van Haren, K., Bonkowsky, J. L., Bernard, G., Pizzino, A., Braverman, N., Suhr, D., Patterson, M. C., Fatemi, S. A., Leonard, J., van der Knaap, M. S., Back, S. A., Damiani, et al
  2015; 114 (4): 527-536

- **Consensus statement on preventive and symptomatic care of leukodystrophy patients** *MOLECULAR GENETICS AND METABOLISM*
  Van Haren, K., Bonkowsky, J. L., Bernard, G., Murphy, J. L., Pizzino, A., Helman, G., Suhr, D., Waggoner, J., Hobson, D., Vanderver, A., Patterson, M. C.
  2015; 114 (4): 516-526

- **Disease specific therapies in leukodystrophies and leukoencephalopathies.** *Molecular genetics and metabolism*
  Helman, G., Van Haren, K., Bonkowsky, J. L., Bernard, G., Pizzino, A., Braverman, N., Suhr, D., Patterson, M. C., Ali Fatemi, S., Leonard, J., van der Knaap, M. S., Back, S. A., Damiani, et al
  2015; 114 (4): 527-536

- **De Novo Mutations in the Motor Domain of KIF1A Cause Cognitive Impairment, Spastic Paraparesis, Axonal Neuropathy, and Cerebellar Atrophy** *HUMAN MUTATION*
  Lee, J., Srour, M., Kim, D., Hamdan, F. F., Lim, S., Brunel-Guitton, C., Decarie, J., Rossignol, E., Mitchell, G. A., Schreiber, A., Moran, R., Van Haren, K., Richardson, et al
  2015; 36 (1): 69-78

- **Acute Flaccid Paralysis with Anterior Myelitis - California, June 2012-June 2014** *MMWR-MORBIDITY AND MORTALITY WEEKLY REPORT*
  Ayscue, P., Van Haren, K., Sheriff, H., Waubant, E., Waldron, P., Yagi, S., Yen, C., Clayton, A., Padilla, T., Pan, C., Reichel, J., Harriman, K., Watt, et al
  2014; 63 (40): 903-906

- **National Variation in Costs and Mortality for Leukodystrophy Patients in US Children's Hospitals** *PEDIATRIC NEUROLOGY*
  Brimley, C. J., Lopez, J., Van Haren, K., Wilkes, J., Sheng, X., Nelson, C., Korgenski, E. K., Srivastava, R., Bonkowsky, J. L.
  2013; 49 (3): 156-162

- **Case Report of Subdural Hematoma in a Patient With Sturge-Weber Syndrome and Literature Review: Questions and Implications for Therapy** *JOURNAL OF CHILD NEUROLOGY*
  Lopez, J., Yeom, K. W., Comi, A., Van Haren, K.
  2013; 28 (5): 672-675

- **Vitamin D Status as a Risk Factor for Cerebral Demyelination in X-Linked Adrenoleukdystrophy**
  Van Haren, K., Mowry, E., Raymond, G., Moser, A., Steinman, L.
  LIPPINCOTT WILLIAMS & WILKINS.2013

- **Therapeutic Advances in Pediatric Multiple Sclerosis.** *The Journal of pediatrics*
  2013

- **Fahr's Disease: Pediatric Presentation of a Rare Neurodegenerative Disorder**
  Singhal, N., Van Haren, K., Wu, Y.
  LIPPINCOTT WILLIAMS & WILKINS.2012

- **Fahr's Disease: Pediatric Presentation of a Rare Neurodegenerative Disorder**
  Singhal, N., Van Haren, K., Wu, Y.
  LIPPINCOTT WILLIAMS & WILKINS.2012

- **Immune response in Leukodystrophies** *PEDIATRIC NEUROLOGY*
  Eichler, F., Van Haren, K.
  2007; 37 (4): 235-244

- **The unfolded protein response in vanishing white matter disease** *JOURNAL OF NEUROPATHOLOGY AND EXPERIMENTAL NEUROLOGY*
  van der Voorn, J. P., van Kollenburg, B., Bertrand, G., Van Haren, K., Scheper, G. C., Powers, J. M., van der Knaap, M. S.
  2005; 64 (9): 770-775

- **The life and death of Oligodendrocytes in vanishing white matter disease** *79th Annual Meeting of the American-Association-of-Neuropathologists*
  Van Haren, K., van der Voorn, J. P., PETERSON, D. R., van der Knaap, M. S., Powers, J. M.
  LIPPINCOTT WILLIAMS & WILKINS.2004: 618–30