OTTO VON GUERICKE UNIVERSITÄT MAGDEBURG

MED MEDIZINISCHE FAKULTÄT

Forschungsbericht 2023

Institut für Biochemie und Zellbiologie

INSTITUT FÜR BIOCHEMIE UND ZELLBIOLOGIE

Leipziger Str. 44, 39120 Magdeburg
Tel. 49 (0)391 67 14276, Fax 49 (0)391 67 14365
klaus.fischer@med.ovgu.de

1. LEITUNG

Prof. Dr. rer. nat. Klaus-Dieter Fischer

2. HOCHSCHULLEHRER/INNEN

Prof. Dr. rer. nat. Mario Engelmann
Prof. Dr. rer. nat. Klaus-Dieter Fischer
Frau Prof. Dr. rer. nat. em. Gerburg Keilhoff
Prof. Dr. rer. nat. em. Peter Schönfeld

3. FORSCHUNGSPROFIL

- Charakterisierung molekularer Grundlagen der Differenzierung und Aktivierung von Zellen des Immun- und Nervensystems sowie deren pathophysiologischen Prozessen
- *In vitro*- und i*n vivo*-Analyse der Leukozytenmigration
- Mikroglia: Aktindynamik und zelluläre Bewegung
- Etablierung von Tiermodellen zur Analyse von Rho-GTPasen und ihren Aktivatoren (Rho-GEFs) im Immun- und Nervensystem
- Analyse mitochondrialer Dysfunktionen im Zellstoffwechsel
- Neuroendokrinologie und Verhalten; Stress, Lernen und Gedächtnis

4. KOOPERATIONEN

- Dr. Ulrich Thomas, Abteilung Neurochemie & Molekularbiologie, Leibniz-Institut für Neurobiologie Magdeburg
- Jun. Prof. Sascha Kahlfuss, Institut für Molekulare und Klinische Immunologie (IMKI), Universitätsklinikum Magdeburg A.ö.R.,

5. FORSCHUNGSPROJEKTE

Projektleitung: Prof. Dr. habil. Klaus-Dieter Fischer, Dr. Mark Korthals
Förderer: Haushalt - 01.01.2021 - 31.03.2024

Immune cell calcium signaling: how PMCAs shape Ca2+ levels for development and function of lymphocytes and dendritic cells

Calcium ions (Ca^{2+}) are a universal signaling mediator that all cells use to translate receptor activation into distinct outcomes, but how immune cells terminate Ca^{2+} signaling is not completely understood. Here, we investigate the functions of a calcium ion (Ca^{2+}) transporter family of plasma membrane Ca^{2+} ATPases (PMCAs). PMCA transports Ca^{2+} out of the cytosol to the extracellular milieu in response to rising Ca^{2+} levels activated by surface receptors. In humans, PMCAs are involved in many diseases including malaria, deafness, and high blood pressure, among others. We found that PMCA1 binds constitutively to a chaperone-like molecule called Neuroplastin in T and B cells and is responsible for terminating TCR- and BCR-induced Ca^{2+} signals. Based on these findings, we are currently studying the roles of PMCAs in lymphocyte and dendritic cell (DCs) development and immune responses.

6. VERÖFFENTLICHUNGEN

BEGUTACHTETE ZEITSCHRIFTENAUFSÄTZE

Beckmann, David; Langnaese, Kristina; Gottfried, Anna; Hradsky, Johannes; Tedford, Kerry; Tiwari, Nikhil; Thomas, Ulrich; Fischer, Klaus-Dieter; Korthals, Mark
Ca2+ homeostasis by plasma membrane Ca2+ ATPase (PMCA) 1 is essential for the development of DP thymocytes
International journal of molecular sciences - Basel : Molecular Diversity Preservation International, Bd. 24 (2023), Heft 2, Artikel 1442, insges. 20 S.
[Imp.fact.: 5.6]

Bernstein, Hans-Gert; Keilhoff, Gerburg; Dobrowolny, Henrik; Steiner, Johann
The many facets of CD26/dipeptidyl peptidase 4 and its inhibitors in disorders of the CNS - a critical overview
Reviews in the neurosciences - Berlin : de Gruyter, Bd. 34 (2023), Heft 1, S. 1-24
[Imp.fact.: 4.1]

Bernstein, Hans-Gert; Smalla, Karl-Heinz; Keilhoff, Gerburg; Dobrowolny, Henrik; Kreutz, Michael R.; Steiner, Johann
The many "Neurofaces" of prohibitins 1 and 2 - crucial for the healthy brain, dysregulated in numerous brain disorders
Journal of chemical neuroanatomy - Amsterdam [u.a.]: Elsevier Science, Bd. 132 (2023), Artikel 102321, insges. 12 S.
[Imp.fact.: 2.8]

Cangalaya Lira, Carla Marcia; Wegmann, Susanne; Sun, Weilun; Diez, Lisa; Gottfried, Anna; Richter, Karin; Stoyanov, Stoyan; Pakan, Janelle M. P.; Fischer, Klaus-Dieter; Dityatev, Alexander
Real-time mechanisms of exacerbated synaptic remodeling by microglia in acute models of systemic inflammation and tauopathy
Brain, behavior and immunity - Orlando, Fla. [u.a.]: Elsevier, Bd. 110 (2023), S. 245-259
[Imp.fact.: 15.1]

Klämbt, Verena; Bürger, Florian; Wang, Chunyan; Naert, Thomas; Richter, Karin; Nauth, Theresa; Weiss, Anna-Carina; Sieckmann, Tobias; Lai, Ethan; Connaughton, Dervla M.; Seltzsam, Steve; Mann, Nina; Majmundar, Amar J.; Wu, Chen-Han W.; Onuchic-Whitford, Ana C.; Shril, Shirlee; Schneider, Sophia; Schierbaum, Luca; Dai, Rufeng; Bekheirnia, Mir Reza; Joosten, Marieke; Shlomovitz, Omer; Vivante, Asaf; Banne, Ehud; Mane, Shrikant; Lifton, Richard P.; Kirschner, Karin M.; Kispert, Andreas; Rosenberger, Georg; Fischer, Klaus-Dieter; Lienkamp, Soeren; Zegers, Mirjam M. P.; Hildebrandt, Friedhelm
Genetic variants in ARHGEF6 cause congenital anomalies of the kidneys and urinary tract in humans, mice, and frogs
Journal of the American Society of Nephrology - Washington, DC : American Society of Nephrology, Bd. 34 (2023), Heft 2, S. 273-290
[Imp.fact.: 13.6]