OTTO VON GUERICKE UNIVERSITÄT MAGDEBURG

MED MEDIZINISCHE FAKULTÄT

Forschungsbericht 2022

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

5. FORSCHUNGSPROJEKTE

Projektleitung: Prof. Dr. habil. Klaus-Dieter Fischer, Prof. Dr. Alexander Dityatev
Projektbearbeitung: M.Sc. Carla Marcia Cangalaya Lira
Förderer: EU - ESF Sachsen-Anhalt - 01.06.2017 - 31.03.2022

ABINEP M1-project 4: Cytoskelett-dependent mechanisms of the microglia-matrix-neuron-interaction during neuroinflammatory processes

Modul Neuroinflamation:
Neuroinflammatorische Reaktionen sind krankheits-spezifisch und werden durch intensive wechselseitige Regulation von Zellen des Gehirns (Astrozyten, Neurone, Mikroglia) mit Zellen des Immunsystems hervorgerufen. Diese zellulären Interaktionen sind bisher weitestgehend unverstanden. In dem Projekt werden Zytoskelett-abhängige Mechanismen der Mikroglia - Matrix - Neuron Interaktion bei neuroinflammatorischen Prozessen untersucht.

Projektleitung: Prof. Dr. habil. Klaus-Dieter Fischer
Projektbearbeitung: Dr. rer. nat. Karen Tedford, Dr. rer. nat. 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

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. 33 (2022);
[Imp.fact.: 4.703]

Betzler, Annika C.; Kieser, Sebastian Karl; Fiedler, Katja; Laban, Simon Andreas; Theodoraki, Marie-Nicole; Schuler, Patrick; Wirth, Thomas; Tedford, Kerry; Fischer, Klaus-Dieter; Hoffmann, Thomas K.; Brunner, Cornelia
Differential requirement of Vav proteins for Btk-dependent and independent signaling during B cell development
Frontiers in cell and developmental biology - Lausanne: Frontiers Media, 2013, Bd. 10 (2022), insges. 15 S.;
[Imp.fact.: 6.081]

Busse, Mandy; Langwisch, Stefanie; Tedford, Kerry; Fischer, Klaus-Dieter; Zenclussen, Ana Claudia
Maternal B cell signaling orchestrates fetal development in mice
Development <Cambridge>- Cambridge: The Company of Biologists, Bd. 149 (2022), 8;
[Imp.fact.: 6.862]

Ebner, Karl; Sartori, Simone; Murau, Rita; Kopel, Fabian; Kalaba, Predrag; Dragačević, Vladimir; Leban, Johann; Singewald, Nicolas; Engelmann, Mario; Lubec, Gert
The novel analogue of modafinil CE-158 protects social memory against interference and triggers the release of dopamine in the nucleus accumbens of mice
Biomolecules - Basel: MDPI, 2011, Bd. 12 (2022), 4, insges. 13 S.;
[Imp.fact.: 6.064]

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; 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/ American Society of Nephrology - Washington, DC: American Society of Nephrology, Bd. 33 (2022);
[Imp.fact.: 14.981]

Kouhnavardi, Shima; Ecevitoglu, Alev; Dragačević, Vladimir; Sanna, Fabrizio; Arias-Sandoval, Edgar; Kalaba, Predrag; Kirchhofer, Michael; Lubec, Jana; Niello, Marco; Holy, Marion; Zehl, Martin; Pillwein, Matthias; Wackerlig, Judith; Murau, Rita; Mohrmann, Andrea; Beard, Kathryn R.; Sitte, Harald H.; Urban, Ernst; Sagheddu, Claudia; Pistis, Marco; Plasenzotti, Roberto; Salamone, John D.; Langer, Thierry; Lubec, Gert; Monje, Francisco J.
A novel and selective dopamine transporter inhibitor, (S)-MK-26, promotes hippocampal synaptic plasticity and restores effort-related motivational dysfunctions
Biomolecules - Basel: MDPI, 2011, Bd. 12 (2022), 7, insges. 33 S.;
[Imp.fact.: 6.064]

Schnöder, Tina; Schwarzer, Adrian; Jayavelu, Ashok Kumar; Hsu, Chen-Jen; Kirkpatrick, Joanna; Döhner, Konstanze; Perner, Florian; Eifert, Theresa; Huber, Nicolas; Arreba-Tutusaus, Patricia; Dolnik, Anna; Assi, Salam A.; Nafria, Monica; Jiang, Lu; Dai, Yu-Ting; Chen, Zhu; Chen, Sai-Juan; Kellaway, Sophie G.; Ptasinska, Anetta; Ng, Elizabeth S.; Stanley, Edouard G.; Elefanty, Andrew G.; Buschbeck, Marcus; Bierhoff, Holger; Brodt, Steffen; Matziolis, Georgios; Fischer, Klaus-Dieter; Hochhaus, Andreas; Chen, Chun-Wei; Heidenreich, Olaf; Mann, Matthias; Lane, Steven W.; Bullinger, Lars; Ori, Alessandro; Eyß, Björn; Bonifer, Constanze; Heidel, Florian
PLCG1 is required for AML1-ETO leukemia stem cell self-renewal
Blood - Washington, DC: American Society of Hematology, Bd. 139 (2022), 7, S. 1080-1097;
[Imp.fact.: 25.476]

Török, Bibiána; Csikota, Péter; Fodor, Anna; Balázsfi, Diána; Ferenczi, Szilamér; Demeter, Kornél; Tóth, Zsuzsanna E.; Könczöl, Katalin; Camats Perna, Judith; Farkas, Imre; Kovács, Krisztina J.; Haller, József; Engelmann, Mario; Zelena, Dóra
Rescue of vasopressin synthesis in magnocellular neurons of the supraoptic nucleus normalises acute stress-induced adrenocorticotropin secretion and unmasks an effect on social behaviour in male vasopressin-deficient brattleboro rats
International journal of molecular sciences - Basel: Molecular Diversity Preservation International, 2000, Bd. 23 (2022), 3, insges. 22 S.;
[Imp.fact.: 6.208]

Wackernagel, Lisa-Marie; Sarabi, Mohsen Abdi; Weinert, Sönke; Zuschratter, Werner; Richter, Karin; Fischer, Klaus-Dieter; Braun-Dullaeus, Ruediger C.; Medunjanin, Senad
IKKγ/NEMO localization into multivesicular bodies
International journal of molecular sciences - Basel: Molecular Diversity Preservation International, 2000, Bd. 23 (2022), 12, insges. 12 S.;
[Imp.fact.: 6.208]