

Curriculum Vitae

Name Nahla Galal Metwally M.D., PhD

Contact Postdoctoral Researcher - Research Group Host Parasite Interaction
Bernhard Nocht Institute for Tropical Medicine (BNITM)
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Research Focus

Malaria, host-parasite interactions, endothelial cells, Bioinformatics and microRNA

Funding

- [2024] German Center for Infection Research (DZIF) - one MD-Stipend for one year-
“Characterising the signal pathways that affect the integrity of human blood brain barrier during malaria infection
- [2022] Jürgen Manschot – one PhD student for 2 years
- [2021] Leibniz Center of Infection (LCI) graduate school – one PhD student for 3 years
“Characterization of the immunomodulatory and inflammatory effects of extracellular vesicles secreted by human brain endothelial cells during *Plasmodium falciparum* infection using next generation sequencing and CRISPR-Cas9 technologies”
- [2019/20] German Center for Infection Research (DZIF) – one MD-Stipend for one year “Influence of cytoadhesion of *Plasmodium falciparum* infected erythrocytes on human lung endothelial cells”

Current projects (as a principal investigator)

1. Characterization of miRNA profiles of extracellular vesicles secreted by *P. falciparum* infected human red blood cells
2. Effect of *P. falciparum* cytoadhesion on human endothelial cells from different organs.
3. mRNA/miRNA expression analysis of human endothelial cells exposed to *P. falciparum* infected human red blood cells under controlled shear stress.

Education

- [2016] Dr. rer. nat. with very good grade (magna cum laude) - BNITM - UHH¹ - Germany
- [2011] Master’s degree with excellent Honors, Medical Parasitology - FOMSCU² - Egypt
- [2010] Microbiology and Immunology course with excellent grade - FOMSCU² - Egypt
- [2008] Egyptian Medical License
- [2006] MBBCh - with very good grade - FOMSCU² - Egypt

Research Experience

Since [2018]	Postdoctoral researcher - BNITM - contract until 30.06.2029
[2016] - [2017]	Postdoctoral researcher and lecturer of Medical Parasitology - FOMSCU ² - Egypt
[2013] - [2016]	PhD Student - BNITM/UHH - Hamburg - Germany
[2011] - [2013]	Research associate and assistant lecturer of Medical Parasitology - FOMSCU ² - Egypt

Science management Experience

Since [2022]	Diversity and equal opportunities deputy - BNITM
[2010] - [2018]	Cofounder of nonprofit organization to build medical research center - FOMSCU ²
[2012]	Facilitator in leadership development program for health professions - FOMSCU ²
[2010]	Parasitology department organizer at the quality assurance unit - FOMSCU ²

¹University of Hamburg (UHH)

²Faculty of Medicine Suez Canal University (FOMSCU)

Professional Activities

[2021-ongoing]	Elected Postdoc speaker – BNITM
[2021-2024]	Elected PhD students' confidant
[2021]	Member of Career development working group- Leibniz postdoctoral association.

Thesis supervision (as a principal investigator)

Doctoral students

[2022- ongoing]	Transcriptomic changes of human lung endothelial cells during <i>Plasmodium falciparum</i> infection. Hanifeh Torabi - Department of Biology - MIN faculty - UHH
[2022- ongoing]	Characterization of the immunomodulatory and inflammatory effects of extracellular vesicles secreted by human brain endothelial cells during <i>Plasmodium falciparum</i> infection using next generation sequencing and CRISPR-cas9 technologies- Maria-del-Pilar Martinez Tauler - Department of Biology - MIN faculty - UHH
[2020- 2023]	Influence of cytoadhesion of <i>Plasmodium falciparum</i> infected erythrocytes on human lung endothelial cells - Tabea Schell - Faculty of Medicine - UHH
[2019 - 2023]	Characterizing the interaction between <i>Plasmodium falciparum</i> and human brain, dermal and lung endothelial cells - Yifan Wu - Department of Biology - MIN faculty - UHH

Master's students

[2023]	Analysis of the activation of human brain endothelial cells during <i>Plasmodium falciparum</i> infection under shear stress – Maryéva Bessemoulin - University of Strasbourg, France.
[2021]	Investigation of febrile conditions and stimulation through TNF α on human brain and lung endothelial cells under shear stress using next generation sequencing - Johannes Allweier - Department of Biotechnology - HAW (Hamburg University of Applied Science).
[2021]	Influence of <i>Plasmodium falciparum</i> infected erythrocytes on gene expression of human endothelial cells - Hanifeh Torabi - Department of Biology - MIN faculty - UHH

- [2020] Characterizing the response of different human endothelial cells exposed to cytoadhesion of *Plasmodium falciparum* infected erythrocytes - Shu Njiyang - University of Lübeck
- [2020] Characterization of extracellular vesicles from *P. falciparum*-infected red blood cells and their immunological effects - Stephanie Leyk - Department of Biology - UHH
- [2020] Characterization of the binding capacity of *Plasmodium falciparum* infected erythrocytes to different endothelial cell lines - Jean Maximilian Rakotonirinalalao - MIN faculty - UHH
- [2019] Stimulation of the knob formation in *Plasmodium falciparum* infected erythrocytes - Philip Bouws - Department of Biology - MIN faculty - UHH
- [2018] Characterization of the binding behaviour of *Plasmodium falciparum* infected erythrocytes with analysis of the temperature effect on the *var* gene expression - Vincent Jordan - Department of Biology - MIN faculty - UHH

Bachelor students

- [2022] Binding of *P. falciparum* infected red blood cells to human endothelial receptors EPCR. Milad Temori - Department of Biotechnology - HAW
- [2021] Analysing the binding capacity of *P. falciparum* infected erythrocytes expressing MAL6P1.252 gene to human brain endothelial cells - Margherita Pignataro – Faculty of Biotechnology - University of Eastern Piedmont – Italy
- [2020] Characterization of the cytoadhesion of 3D7 *Plasmodium falciparum* erythrocytes expressing MAL6P1.252 *var* gene to human brain and lung endothelial cells - David Danicic – Rauchberger - FH KREMS - University of Applied Science - Austria

Teaching

MIN Faculty- UHH

- [2019] - [2024] Master's students - Molecular Parasitology course
- [2019] - [2023] Bachelor's students - Animal Physiology practical course
- [2019] - [2024] Bachelor's students - Cell Biology and Biochemistry practical course

Faculty of Medicine - Suez Canal University

- [2017] SCMSA International Summer School for Tropical Medicine and Infectious Diseases
- [2017] Real-time PCR course at the Center of Excellence in Cellular and Molecular Medicine
- [2016] - [2017] Medical and Molecular Parasitology Course - undergraduate and postgraduate students
- [2009] - [2012] Parasitology Laboratory - undergraduate students
- [2008] Skill Lab tutor
- [2008] - [2009] Undergraduate students class tutor

Professional Activities

- [2021-ongoing] Elected PhD students' confidant
- [2021-ongoing] Elected Postdoc speaker – BNITM
- [2021] Member of Career development working group- Leibniz postdoctoral association

Honors and Recognitions

- [2018] Best thesis award awarded by the Association of Friends of BNITM (VdF)
- [2012] DAAD (German Academic exchange service) PhD Scholarship
- [2011] Member of "Okool Masrya" Team, that win the 1st place in contest, which was held by Dr. Amr Khaled for developing the system of scientific research in Egypt in the preceding 5 years

Presentations

- [2023] KIT conference "16. Kongress für Infektionskrankheiten und Tropenmedizin" Leipzig-Germany).
- [2023] Gordon Research conference "Malaria" Barcelona-Spain.
- [2023] 15th Malaria meeting- BNITM- Hamburg-Germany
- [2023] LCI Symposium "Compartments in infection" - BNITM- Hamburg-Germany
- [2023] 29th Annual Meeting of the German Society for Parasitology
- [2022] ICOPA 2022 -Copenhagen-Denmark
- [2022] BioMalPar: Biology and Pathology of the Malaria Parasite - Heidelberg-Germany
- [2021] 29th Annual Meeting of the German Society for Parasitology - Virtual
- [2020] BioMalPar XVI: Biology and Pathology of the Malaria Parasite - Virtual
- [2019] 14th Malaria meeting- BNITM - Hamburg, Germany
- [2019] BioMalPar XV: Biology and Pathology of the Malaria Parasite - EMBL- Heidelberg, Germany
- [2016] BioMalPar XII: Biology and Pathology of the Malaria Parasite - EMBL- Heidelberg, Germany
- [2016] 27th Annual Meeting of the German Society for Parasitology - Göttingen, Germany
- [2015] 13th Malaria meeting- BNITM - Hamburg, Germany
- [2015] BioMalPar XI: Biology and Pathology of the Malaria Parasite - EMBL- Heidelberg, Germany
- [2015] DGP 8th Short Course for Young Parasitologists - Hamburg, Germany

Soft Skill Courses

Training of trainers (Diploma), Conflict management, Time management, Presentation skills.

Bioinformatic Courses

- [2017] R language in bioinformatics and statistics (FOMSCU)
- [2018] Bioinformatic summer school (Glasgow University)

Publications

1. **Nahla Metwally***, Maria del Pilar Martinez Tauler*, Hanifeh Torabi* et al. Tissue-specific responses of brain and lung endothelial cell miRNA and mRNA profiles to the ring-stage *Plasmodium falciparum*-infected red blood cells, 07 April 2024, PREPRINT (Version 1) available at Research Square [<https://doi.org/10.21203/rs.3.rs-4222036/v1>]
2. Wu Y, Leyk S, Torabi H, Höhn K, Honecker B, Tauler M, Cadar D, Jacobs T, Bruchhaus I, and **Metwally NG**. **2023** “*Plasmodium falciparum* infection reshapes the human microRNA profiles of red blood cells and their extracellular vesicles” 2023 June 15. doi.org/10.1016/j.isci.2023.107119.
3. Bachmann A*, **Metwally NG***, Allweier J, Cronshagen J, Del Pilar Martinez Tauler M, Murk A, Roth LK, Torabi H, Wu Y, Gutschmann T, Bruchhaus I. CD36-A Host Receptor Necessary for Malaria Parasites to Establish and Maintain Infection. *Microorganisms*. 2022 Nov 29;10(12):2356. doi: 10.3390/microorganisms10122356. PMID: 36557610; *contributed equally.
4. Rehn T, Lubiana P, Nguyen THT, Pansegrau E, Schmitt M, Roth LK, Brehmer J, Roeder T, Cadar D, **Metwally NG**, Bruchhaus I. Ectopic Expression of *Plasmodium vivax* var Genes in *P. falciparum* Affects Cytoadhesion via Increased Expression of Specific var Genes. *Microorganisms*. 2022 Jun 9;10(6):1183. doi: 10.3390/microorganisms10061183. PMID: 35744701.
5. Blancke Soares A, Stäcker J, Schwald S, Hoijmakers W, **Metwally NG**, Schoeler H, Flemming S, Höhn K, Fröhlke U, Mesén-Ramírez P, Bergmann B, Khosh-Naucke M, Bruchhaus I, Bártfai R, Spielmann T. An unusual trafficking domain in MSRP6 defines a complex needed for Maurer’s clefts anchoring and maintenance in *P. falciparum* infected red blood cells (2021) (DOI: 10.1101/2021.12.03.471078).
6. Groneberg M, Hoenow S, Marggraff C, Fehling H, **Metwally NG**, Hansen C, Bruchhaus I, Tiegs G, Sellau J, Lotter H. HIF-1 α modulates sex-specific Th17/Treg responses during hepatic amoebiasis. *J Hepatol*. 2022 Jan;76(1):160-173. doi: 10.1016/j.jhep.2021.09.020. Epub 2021 Sep 29. PMID: 34599999.
7. Raacke M, Kerr A, Dörpinghaus M, Brehmer J, Wu Y, Lorenzen S, Fink C, Jacobs T, Roeder T, Sellau J, Bachmann A, **Metwally NG**, Bruchhaus I. Altered Cytokine Response of Human Brain Endothelial Cells after Stimulation with Malaria Patient Plasma. *Cells*. 2021 Jul 1;10(7):1656. doi: 10.3390/cells10071656. PMID: 34359826
8. Wu Y, Bouws P, Lorenzen S, Bruchhaus I, **Metwally NG**. Analysis of the Interaction Between *Plasmodium falciparum*-Infected Erythrocytes and Human Endothelial Cells Using a Laminar Flow System, Bioinformatic Tracking and Transcriptome Analysis. *Methods Mol Biol*. 2021;2369:187-197. doi: 10.1007/978-1-0716-1681-9_11. PMID: 34313990.
9. König C, Honecker B, Wilson IW, Weedall GD, Hall N, Roeder T, **Metwally NG**, Bruchhaus I. Taxon-Specific Proteins of the Pathogenic *Entamoeba* Species *E. histolytica* and *E. nuttalli*. *Front Cell Infect Microbiol*. 2021 Mar 19;11:641472. doi: 10.3389/fcimb.2021.641472. PMID: 33816346; PMCID: PMC8017271.
10. König C, Meyer M, Lender C, Nehls S, Wallaschkowski T, Holm T, Matthies T, Lercher D, Matthiesen J, Fehling H, Roeder T, Reindl S, Rosenthal M, **Metwally NG**, Lotter H, Bruchhaus I. An Alcohol Dehydrogenase 3 (ADH3) from *Entamoeba histolytica* Is Involved in the Detoxification of Toxic Aldehydes. *Microorganisms*. 2020 Oct 19;8(10):1608. doi: 10.3390/microorganisms8101608. PMID: 33086693; PMCID: PMC7594077.
11. Sellau J, Groneberg M, Fehling H, Thye T, Hoenow S, Marggraff C, Weskamm M, Hansen C, Stanelle-Bertram S, Kuehl S, Noll J, Wolf V, **Metwally NG**, Hagen SH, Dorn C, Wernecke J, Ittrich H, Tannich E, Jacobs T, Bruchhaus I, Altfeld M, Lotter H. Androgens predispose males to monocyte-mediated immunopathology by

inducing the expression of leukocyte recruitment factor CXCL1. *Nat Commun.* 2020 Jul 10;11(1):3459. doi: 10.1038/s41467-020-17260-y. PMID: 32651360; PMCID: PMC7351718.

12. Lubiana P, Bouws P, Roth LK, Dörpinghaus M, Rehn T, Brehmer J, Wichers JS, Bachmann A, Höhn K, Roeder T, Thye T, Gutschmann T, Burmester T, Bruchhaus I, **Metwally NG**. Adhesion between *P. falciparum* infected erythrocytes and human endothelial receptors follows alternative binding dynamics under flow and febrile conditions. *Sci Rep.* 2020 Mar 11;10(1):4548. doi: 10.1038/s41598-020-61388-2. PMID: 32161335; PMCID: PMC7066226.
13. Dörpinghaus M, Fürstenwerth F, Roth LK, Bouws P, Rakotonirinalalao M, Jordan V, Sauer M, Rehn T, Pansegrau E, Höhn K, Mesén-Ramírez P, Bachmann A, Lorenzen S, Roeder T, **Metwally NG**, Bruchhaus I. Stringent Selection of Knobby *Plasmodium falciparum*-Infected Erythrocytes during Cytoadhesion at Febrile Temperature. *Microorganisms.* 2020 Jan 25;8(2):174. doi: 10.3390/microorganisms8020174. PMID: 31991814; PMCID: PMC7074740.
14. **Metwally NG**, Tilly AK, Lubiana P, Roth LK, Dörpinghaus M, Lorenzen S, Schuldt K, Witt S, Bachmann A, Tidow H, Gutschmann T, Burmester T, Roeder T, Tannich E, Bruchhaus I. Characterisation of *Plasmodium falciparum* populations selected on the human endothelial receptors P-selectin, E-selectin, CD9 and CD151. *Sci Rep.* 2017 Jun 22;7(1):4069. doi: 10.1038/s41598-017-04241-3. PMID: 28642573; PMCID: PMC5481354.
15. Tilly AK, Thiede J, **Metwally N**, Lubiana P, Bachmann A, Roeder T, Rockliffe N, Lorenzen S, Tannich E, Gutschmann T, Bruchhaus I. Type of in vitro cultivation influences cytoadhesion, knob structure, protein localization and transcriptome profile of *Plasmodium falciparum*. *Sci Rep.* 2015 Nov 16;5:16766. doi: 10.1038/srep16766. PMID: 26568166; PMCID: PMC4645185.
16. Rayan HZ, Soliman RH, **Galal, NM** (2012). Detection of *Strongyloides stercoralis* in Fecal Samples Using Conventional Parasitological Techniques and Real-Time PCR: A Comparative Study. *PUJ Volume* (5:1).