

Natalia El-Merhie, Ph.D

Early life origins of chronic lung diseases

Research Center Borstel

Leibniz-Center for Medicine and Biosciences

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EDUCATION

- 11.2012-07.2017 **Ph.D**
Group of Medical Cell Biology
Faculty of Medicine
Institute of Anatomy and Cell Biology
Justus Liebig University,
Giessen, Germany
Supervisor - Prof. Dr. Eveline Baumgart-Vogt
Doctoral Thesis - Summa cum Laude
The role of peroxisomes in chronic obstructive pulmonary disease (COPD)
- 10.2012-06.2015 **Molecular Biology and Medicine of the Lung (MBML)**
Successfully passed written examinations at the end of each term
Justus Liebig University,
Giessen, Germany
- 10.2012-11.2015 **International Giessen Graduate School for Life Sciences (GGL)**
Justus Liebig University,
Giessen, Germany
- 10.2009 – 03.2012 **M.Sc in Biology**
Beirut Arab University,
Lebanon
Thesis - GPA=3.52/4
Effect of calcium treatment on blood parameters, gonadal development
and structure of bone in immature female rats
- 10.2005-07.2009 **B.Sc in Biology**
Beirut Arab University,
Lebanon
GPA=3.32/4

EXPERIENCE

- 09.2017-Present **Postdoctoral Researcher**
Group of Early Life Origins of Chronic Lung Diseases
Laboratory of Prof. Dr. Susanne Krauss-Etschmann
Research Center Borstel

*Leibniz-Center for Medicine and Biosciences
Borstel, Germany*

- ❖ **Research:** studying the underlying mechanisms of COPD pathogenesis in *in vitro* model using cigarette smoke in combination with the viral mimetic that recapitulates viral infection in the upper pulmonary airways
- ❖ **Co-supervisor of two PhD students**
 - Identification of mediators released during early stages of exacerbation in response to Poly (I:C) (a viral mimetic) trigger in smoke-exposed mouse model and further understanding whether these mediators could be used to predict COPD exacerbation
 - Investigation of the immune system of the offspring exposed to mild maternal smoking during pregnancy and investigation whether this adverse prenatal environment could predispose the offspring to develop pulmonary diseases later in life
 - Establishment of a paternal smoking mouse model until the onset of puberty in order to study the effects of pre-pubertal parental smoke exposure on gene expression and miRNA alterations in sperm and testis and to understand whether these pre-pubertal exposures affect the pulmonary health of the future offspring (lung function, lung development and immune status)
- ❖ **Member of the Borstel Postdoc Initiative (within the Leibniz Association)**

10.2012-07.2017

PhD Researcher

*Institute of Anatomy and Cell Biology
Justus Liebig University,
Giessen, Germany*

Research on the role of peroxisomes in COPD with the focus on anti-oxidative pathways, peroxisome proliferator –activated receptor gamma (PPAR γ), localization, expression and abundance of peroxisomal proteins, isolation of peroxisomal fractions and their subsequent characterization and *in vitro* COPD models for studying alterations and molecular pathogenesis of peroxisomes following peroxisomal biogenesis knockdown.

09.2010-01.2012

Instructor

Beirut Arab University,
Lebanon

Responsible for

❖ Teaching

undergraduate students

- Histology
- Zoology
- Comparative anatomy of vertebrates
- Microbiology

graduate students

- Cell biology

❖ construction and grading of exams

❖ leading discussions

09.2007-10.2007 **Undergraduate Internship in Pathology**
Hammoud Hospital University Medical Center, Lebanon

ADDITIONAL CERTIFICATES

04.2017-07.2017 **Business English Basics for Life Sciences – An eight-session series**
03.2012 **TOEFL iBT – Score 95/120**

TRAVEL GRANTS

07-10.03.2019 **17th ERS Lung Science Conference (LSC) in Estoril, Portugal - (€600)**
13.09.2018 **French-German Lung Retreat (cooperation of DZL and INSERM) in Paris, France –
(Travel costs were covered)**

PROFESSIONAL MEMBERSHIPS and FELLOWSHIPS

Since
03.11.2018 **Member of the Early Career Member Committee (ERS)**
06.08.2018 **Early Career Member of European Respiratory Society (ERS) – Assembly 3**
02.08.2018 **Member of German Society for Pneumology and Respiratory Medicine (DGP)**
01.07.2018 **Academy fellow of German Center for Lung Research (DZL)**

SKILLS

Molecular and Cell Biological Techniques

- Cell lines: culturing of -C22 (bronchial club cells),
 - A549 cells (adenocarcinoma alveolar epithelial cells),
 - T7 (alveolar epithelial type II cells)
- Primary cell lines: isolation and culturing of mouse alveolar type II cells
HBE cells (primary human bronchial epithelial cells)
- Immunofluorescence of cells and tissues
- Immunofluorescence microscopy, including confocal laser scanning microscopy
- Subcellular fractionation of cell lines and tissue
- Separation of proteins by denaturing poly-acrylamide gel electrophoresis
- Qualitative and quantitative protein analysis by using Western blotting
- Fluorescence Assisted Cell Sorting (FACS analysis)
- Transfection of eukaryotic cell-lines (Overexpression, shRNA and siRNA)

Microbiological Techniques:

- All standard microbiological sterile culture and analysis techniques
- Experience with working in Biosafety Levels 1 containment laboratories
- Experience in the culture of *Escherichia coli*
- Blue white screening

Biochemical Techniques:

- Enzyme assays and determination of enzyme kinetic parameters
- Luciferase-based Assays
- ELISA

DNA/RNA Analysis Techniques

- All standard molecular cloning and gene analysis techniques (restriction enzyme digestion, ligation)
- Separation of DNA fragments on Agarose gels
- Isolation of Plasmid DNA from *E. coli*
- Purification of DNA and RNA
- cDNA synthesis
- Qualitative and Quantitative (Real-Time) PCR

Bioinformatics

- Experience with bioinformatics tools, including: DNA and protein sequence analysis (DNA Alignment, BLAST, ClustalOmega), primer design software

Software

- ImageJ
- Photoshop
- GraphPad Prism
- FlowJo

Cigarette smoke apparatus (CS apparatus)

- Established the CS machine for generation of cigarette smoke extract for pulmonary experiments

LANGUAGES

Russian - Native
English - Full working proficiency
Arabic - Full working proficiency
German - Basic

ACTIVITIES

12.09.2013 **Member of the organizing Committee for the 6th GGL Conference 2013**

MANUSCRIPTS IN PREPARATION

Downregulation of peroxisomal biogenesis and metabolism by cigarette smoke in human adenocarcinoma lung cells

El-Merhie N, Karnati S, Janga H, Vijayan V, Baumgart-Vogt E*

The role of peroxisomes in COPD

El-Merhie N, Karnati S, Seimetz M, Weissmann N, Baumgart-Vogt E*

At the root: origins of COPD (a review)

El-Merhie N, Wolff M, Ehrhardt H, Rabe K, Svanes C, Krauss-Etschmann S

Maternal e-cigarette exposure affects development of F1-offspring until adulthood in *Drosophila melanogaster*

El-Merhie N, Arne Kruger A, Uliczka K, Papenmeier S, Wagner C, Krauss-Etschmann S

PUBLICATIONS

Environmental Impact on Health across Generations: Policy Meets Biology. A Review of Animal and Human Models

Lønnebotn M, El-Merhie N, Holloway JW, Horsnell W, Krauss-Etschmann S, Gómez Real F, Svanes C
Challenges 2018, 9(2):42
<https://doi.org/10.3390/challe9020042>

Intrauterine smoke exposure deregulates lung function, pulmonary transcriptomes, and in particular insulin-like growth factor (IGF)-1 in a sex-specific manner

Dehmel S, Nathan P, Bartel S, El-Merhie N, Hagen Scherb, Milger K, John-Schuster G, Yildirim AÖ, Hylkema M, Irmeler M, Beckers J, Schaub B, Eickelberg O, Krauss-Etschmann S
Scientific Reports 2018, 8(1):7547
<https://doi.org/10.1038/s41598-018-25762-5>

Differential alterations of the mitochondrial morphology and respiratory chain complexes during postnatal development of the mouse lung

El-Merhie N, Baumgart-Vogt E, Pilatz P, Pfreimer S, Pfeifer B, Pak O, Djuro K, Michael M, Karnati S
Oxidative Medicine and Cellular Longevity, Volume 2017, Article ID 9169146, 22 pages, 2017
<https://doi.org/10.1155/2017/9169146>

Paper of the Month according to **Anatomische Gesellschaft January-2018**
<https://anatomische-gesellschaft.de/index.php?id=paper-of-the-month-2018-01>

Diagnosis and markers for the assessment of COPD; can a consensus be reached?

El-Merhie N, Boateng E, Tumpara S, Trompak O, Seimetz M, Pilatz A, Baumgart-Vogt E, Karnati S.
PVRI Chronicles, volume 3: issue 2 (2016)

Targeting PPAR γ in Lung fibroblasts: Prospects of therapeutic treatment for IPF

Boateng E, El-Merhie N, Trompak O, Tumpara S, Seimetz S, Pilatz A, Baumgart-Vogt E, Karnati S
PVRI Chronicles, volume 3: issue 2 (2016)

Effect of calcium treatment on blood parameters, gonadal development and the structure of bone in immature female rats

El-Merhie N, Sabry I, Balbaa M
J Physiol Biochem (2012) 68:219–227