

Nasrollah REZAEI GHALEH, MD, PhD
(Another spelling: Nasrollah REZAEI-GHALEH)

DFG-sponsored Group Leader
Institute of Physical Biology
Heinrich Heine University Düsseldorf

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Scopus Author ID: [55884623600](https://scopus.com/authid/detail.url?authorID=55884623600)

Researcher ID: [B-9443-2008](https://www.researcherid.com/rid/B-9443-2008)

Group Webpage: <https://www.ipb.hhu.de/unsere-teams/arbeitsgruppe-rezaei-ghaleh>



• EDUCATION

- | | |
|-------------|--|
| 2001 – 2007 | PhD in Biochemistry;
Institute of Biochemistry and Biophysics, University of Tehran, Tehran, Iran |
| 1991 – 1998 | MD in Medicine;
Faculty of Medicine, Tehran University of Medical Sciences, Tehran, Iran |

• PROFESSIONAL EXPERIENCE

- | | |
|------------------|---|
| 07.2021-....: | Independent DFG-sponsored Principal Investigator; Institute of Physical Biology, Heinrich Heine University (HHU) Düsseldorf, Germany
<i>(DFG project: Towards a high resolution picture of the stability of protein deposits and its modulation in neurodegenerative diseases: visualizing the invisible by fluorine NMR dynamics: RE 3655/2-3)</i> |
| 06.2020-06.2021: | Temporary Scientist position in department for NMR-based Structural Biology, Max Planck Institute for Biophysical Chemistry, Göttingen, Germany, with partial support from the Department of Living Matter Physics, Max Planck Institute for Dynamics and Self-Organization, Göttingen, Germany. |
| 06.2017-05.2020: | Independent DFG-sponsored Principal Investigator; Department of Neurology, University Medical Center Göttingen (UMG), Göttingen, Germany
<i>(DFG project: Towards a high resolution picture of the stability of protein deposits and its modulation in neurodegenerative diseases: role of posttranslational modifications; Grant number: RE 3655/2-1)</i> |
| 10.2012-05.2017: | Postdoctoral Research Associate at research group on Structural Biology in Dementia, German Center for Neurodegenerative Diseases (DZNE), Göttingen, Germany, under the supervision of Prof. [REDACTED]
<i>(Project: Structural biology of neurodegeneration-related protein aggregation).</i> |
| 03.2008-09.2012: | Max Planck Research Scholar (postdoctoral researcher) at research group on Structure Determination of Proteins Using NMR, MPI for Biophysical Chemistry, Göttingen, Germany, under the supervision of Dr. [REDACTED]
<i>(Project: Structural dynamics of amyloid-beta peptide in Alzheimer's disease).</i> |

• LIST OF PUBLICATIONS

Publications (last update: Sep. 2021; h-index: 22 by Scopus, 26 by Google Scholar)

- 1- Mamone S, Gloeggler S, Becker S, **Rezaei-Ghaleh N***
Early Divergence in Misfolding Pathways of Amyloid-Beta Peptides

- ChemPhysChem** (2021)
<https://doi.org/10.1002/cphc.202100542>
- 2- Fuentes-Monteverde JC, Becker S, **Rezaei-Ghaleh N***
Biological phase separation through the lens of sodium-23 NMR
Protein Science 30, 1315-1325 (2021)
<https://doi.org/10.1002/pro.4010>
Special issue “**Biophysics of Biomolecular Condensates**”
- 3- Aliakbari F, Mohammad-Beigi H, Abbasi S, **Rezaei-Ghaleh N**, Lermyte F, Parsafar S, Becker S, Parvaneh Tafreshi A, O'Connor PB, Collingwood JF, Christiansen G, Sutherland DS, Henning Jensen P, Morshedi D*, Otzen DE*
Multiple Protective Roles of Nanoliposome-Incorporated Baicalein against Alpha-Synuclein Aggregates
Advanced Functional Materials 31, 2007765 (2021)
<https://doi.org/10.1002/adfm.202007765>
- 4- Mamone S, **Rezaei-Ghaleh N**, Opazo F, Griesinger C, Gloeggler S*
Singlet-filtered NMR spectroscopy
Science Advances 6, eaaz1955 (2020)
<https://doi.org/10.1126/sciadv.aaz1955>
- 5- **Rezaei-Ghaleh N***, Munari F, Becker S, Assfalg M, Griesinger C
A Facile Oxygen-17 NMR Method to Determine Effective Viscosity in Dilute, Molecularly Crowded and Confined Aqueous Media
Chemical Communications 55, 12404-12407 (2019)
<https://doi.org/10.1039/c9cc06124j>
- 6- **Rezaei-Ghaleh N***, Parigi G, Zweckstetter M
Reorientational Dynamics of Amyloid- β from NMR Spin Relaxation and Molecular Simulation
The Journal of Physical Chemistry Letters 10, 3369-3375 (2019)
<https://doi.org/10.1021/acs.jpcllett.9b01050>
- 7- Ukmar-Godec T, Hutten S, Grieshop M, **Rezaei-Ghaleh N**, Cima-Omori M, Biernat J, Mandelkow E, Söding J, Dormann D, Zweckstetter M*
Lysine/RNA-interactions drive and regulate biomolecular condensation
Nature Communications 10, 2909 (2019)
<https://doi.org/10.1038/s41467-019-10792-y>
- 8- **Rezaei-Ghaleh N**, Parigi G, Soranno A, Holla A, Becker S, Schuler B, Luchinat C*, Zweckstetter M*
Local and global dynamics in intrinsically disordered synuclein
Angewandte Chemie International Edition 57, 15262-15266 (2018)
<https://doi.org/10.1002/anie.201808172>
- 9- Aliakbari F, Mohammad-Beigi H, **Rezaei-Ghaleh N**, Becker S, Dehghani Esmatabad F, Eslampanah Seyedi HA, Bardania H, Tayaranian Marvian A, Collingwood JF, Christiansen G, Zweckstetter M, Otzen DE*, Morshedi D*
The potential of zwitterionic nanoliposomes against neurotoxic alpha-synuclein aggregates in Parkinson's Disease
Nanoscale 10, 9174-9185 (2018)
<https://doi.org/10.1039/c8nr00632f>
- 10- Martinez Hernandez A, Urbanke H, Gillman AL, Lee J, Ryazanov S, Agbemenyah HY, Benito E, Jain G, Kaurani L, Grigorian G, Leonov A, **Rezaei-Ghaleh N**, Wilken P, Arce FT, Wagner J, Fuhrmann M, Caruana M, Camilleri A, Vassallo N, Zweckstetter M, Benz R, Giese A, Schneider A, Korte M*, Lal R*, Griesinger C*, Eichele G*, Fischer A*
The diphenylpyrazole compound anle138b blocks A β channels and rescues disease phenotypes in a mouse model for amyloid pathology.
EMBO Molecular Medicine 10, 32-47 (2018)
<https://doi.org/10.15252/emmm.201707825>

- 11- Rahban M, Salehi N, Saboury AA*, Hosseinkhani S*, Karimi-Jafari MH, Firouzi R, **Rezaei-Ghaleh N**, Moosavi-Movahedi AA
Histidine substitution in the most flexible fragments of firefly luciferase modifies its thermal stability.
Archives of Biochemistry and Biophysics 629, 8-18 (2017)
<https://doi.org/10.1016/j.abb.2017.07.003>
- 12- **Rezaei-Ghaleh N***, Bakhtiari D, Rashidi A
Reverse allostasis in biological systems: Minimal conditions and implications
Journal of Theoretical Biology 426, 134-139 (2017)
<https://doi.org/10.1016/j.jtbi.2017.05.025>
- 13- **Rezaei-Ghaleh N***, Kumar S, Walter J, Zweckstetter M*
Phosphorylation interferes with maturation of amyloid- β fibrillar structure in the N-terminus.
Journal of Biological Chemistry 291, 16059-16067 (2016)
<https://doi.org/10.1074/jbc.M116.728956>
- 14- **Rezaei-Ghaleh N***, Amininasab M, Kumar S, Walter J*, Zweckstetter M*
Phosphorylation modifies stability of β -amyloid deposits.
Nature Communications 7, 11395 (2016)
<https://doi.org/10.1038/ncomms11359>
- 15- Beyer I[‡], **Rezaei-Ghaleh N[‡]**, Klafki HW, Jahn O, Haußmann U, Wiltfang J*, Zweckstetter M*, Knölker HJ*
Solid-phase synthesis and characterization of N-terminally elongated A β -3-x peptides
Chemistry: A European Journal 22, 8685-8693 (2016)
<https://doi.org/10.1002/chem.201600892>
- 16- Kumar S, Wirths O, Stüber K, Wunderlich P, Koch P, Theil S, **Rezaei-Ghaleh N**, Zweckstetter M, Bayer TA, Brüstle O, Thal DR, Walter J*
Phosphorylation of the amyloid β -peptide at Ser26 stabilizes oligomeric assembly and increases neurotoxicity.
Acta Neuropathologica 131, 525-537 (2016)
<https://doi.org/10.1007/s00401-016-1546-0>
- 17- **Rezaei-Ghaleh N***, Klama F, Munari F, Zweckstetter M*
HYCUD: a computational tool for prediction of effective rotational correlation time in flexible proteins
Bioinformatics 31, 1319-1321 (2015)
<https://doi.org/10.1093/bioinformatics/btu824>
- 18- Parigi G[‡], **Rezaei-Ghaleh N[‡]**, Giachetti A, Becker S, Fernandez C, Blackledge M, Griesinger C, Zweckstetter M*, Luchinat C*
Long-range correlated dynamics in intrinsically disordered proteins
Journal of the American Chemical Society 136, 16201-16209 (2014)
<https://doi.org/10.1021/ja506820r>
- 19- **Rezaei-Ghaleh N**, Amininasab M, Giller K, Kumar S, Stundl A, Schneider A, Becker S, Walter J, Zweckstetter M*
Turn plasticity distinguishes different modes of amyloid-beta aggregation.
Journal of the American Chemical Society 136, 4913-4919 (2014)
<https://doi.org/10.1021/ja411707y>
- 20- Buhl T*, Braun A, Forkel S, Möbius W, van Werven L, Jahn O, **Rezaei-Ghaleh N**, Zweckstetter M, Mempel M, Schön MP, Haenssle HA
Internalization routes of cell-penetrating melanoma antigen peptides into human dendritic cells
Experimental Dermatology 23, 20-26 (2014)
<https://doi.org/10.1111/exd.12285>
- 21- **Rezaei-Ghaleh N***, Klama F, Munari F, Zweckstetter M*
Predicting the rotational tumbling of dynamic multidomain proteins and supramolecular complexes
Angewandte Chemie International Edition 52, 11410-11414 (2013)
<https://doi.org/10.1002/anie.201305094>

- 22- Bouter Y[‡], Dietrich K[‡], Wittnam JL[‡], **Rezaei-Ghaleh N[‡]**, Pillot T, Papot-Couturier S, Lefebvre T, Sprenger F, Wirths O, Zweckstetter M, Bayer TA*
N-truncated amyloid β (A β) 4-42 forms stable aggregates and induces acute and long-lasting behavioral deficits.
Acta Neuropathologica 126, 189-205 (2013)
<https://doi.org/10.1007/s00401-013-1129-2>
- 23- Munari F, **Rezaei-Ghaleh N**, Xiang S, Fischle W, Zweckstetter M*
Structural plasticity in human heterochromatin protein 1 β
PLoS One 8, e60887 (2013)
<https://doi.org/10.1371/journal.pone.0060887>
- 24- Kroth H, Ansaloni A, Varisco Y, Jan A, Sreenivasachary N, **Rezaei-Ghaleh N**, Giriens V, Lohmann S, Lopez-Deber MP, Adolfsson O, Pihlgren M, Paganetti P, Froestl W, Nagel-Steger L, Willbold D, Schrader T, Zweckstetter M, Pfeifer A, Lashuel HA, Muhs A*
Discovery and structure activity relationship of small molecule inhibitors of toxic β -amyloid-42 fibril formation
Journal of Biological Chemistry 2287, 34786-34800 (2012)
<https://doi.org/10.1074/jbc.M112.357665>
- 25- Munari F, Soeroes S, Zenn HM, Schomburg A, Kost N, Schroeder S, Klingberg R, **Rezaei-Ghaleh N**, Stuetzer A, Gelato KA, Walla PJ, Becker S, Schwarzer D, Zimmermann B, Fischle W*, Zweckstetter M*
Methylation of K9 in histone H3 directs alternative modes of highly dynamic interaction of heterochromatin protein hHP1 β with the nucleosome.
Journal of Biological Chemistry 287, 33756-33765 (2012)
<https://doi.org/10.1074/jbc.M112.390849>
- 26- **Rezaei-Ghaleh N***, Blackledge M, Zweckstetter M*
Intrinsically disordered proteins: from sequence and conformational properties toward drug discovery (Review)
ChemBioChem 13, 930-950 (2012)
<https://doi.org/10.1002/cbic.201200093>
- 27- **Rezaei-Ghaleh N***, Giller K, Becker S, Zweckstetter M*
Effect of Zinc Binding on β -Amyloid Structure and Dynamics: Implications for A β Aggregation.
Biophysical Journal 101, 1202-1211 (2011)
<https://doi.org/10.1016/j.bpj.2011.06.062>
- 28- Kumar S, **Rezaei-Ghaleh N**, Terwel D, Thal DR, Richard M, Hoch M, Mc Donald JM, Wüllner U, Glebov K, Heneka MT, Walsh DM, Zweckstetter M, Walter J*
Extracellular phosphorylation of the amyloid β -peptide promotes formation of toxic aggregates during the pathogenesis of Alzheimer's disease.
EMBO Journal 30, 2255-2265 (2011)
<https://doi.org/10.1038/emboj.2011.138>
- 29- **Rezaei-Ghaleh N***, Zweckstetter M*
Intrinsically disordered proteins (Review article)
In: **eLS (Encyclopedia of Life Sciences)**. John Wiley & Sons, Ltd: Chichester (September 2011)
<https://doi.org/10.1002/9780470015902.a0023212>
- 30- **Rezaei-Ghaleh N**, Andreetto E, Yan LM, Kapurniotu A, Zweckstetter M*
Interaction between amyloid beta peptide and an aggregation blocker peptide mimicking islet amyloid polypeptide
PLoS One 6, e20289 (2011)
<https://doi.org/10.1371/journal.pone.0020289>
- 31- Ebrahim-Habibi A*, Morshedi D, **Rezaei-Ghaleh N**, Sabbaghian M, Nemat-Gorgani M*
Protein-protein interactions leading to aggregation: perspectives on mechanism, significance and control
Journal of the Iranian Chemical Society 7, 521-544 (2010)

- Click [here](#) for the article.
- 32- Karpinar DP, Baliya MB, Kügler S, Opazo F, **Rezaei-Ghaleh N**, Wender N, Kim HY, Taschenberger G, Falkenburger BH, Heise H, Kumar A, Riedel D, Fichtner L, Voigt A, Braus GH, Giller K, Becker S, Herzig A, Baldus M, Jäckle H, Eimer S*, Schulz JB*, Griesinger C*, Zweckstetter M*
Prefibrillar alpha-synuclein variants with impaired beta structure increase neurotoxicity in Parkinson's disease model.
EMBO Journal 28, 3256-3268 (2009)
<https://doi.org/10.1038/emboj.2009.257>
- 33- **Rezaei-Ghaleh N**, Zweckstetter M, Morshedi D, Ebrahim-Habibi A, Nemat-Gorgani M*
Amyloidogenic potential of alpha-chymotrypsin in different conformational states
Biopolymers 91, 28-36 (2008)
<https://doi.org/10.1002/bip.21079>
- 34- **Rezaei-Ghaleh N**, Amininasab M, Nemat-Gorgani M*
Conformational changes of {alpha}-chymotrypsin in a fibrillation-promoting condition: A molecular dynamics study
Biophysical Journal 95, 4139-4147 (2008)
<https://doi.org/10.1529/biophysj.108.132407>
- 35- Morshedi D, **Rezaei-Ghaleh N**, Ebrahim-Habibi A, Ahmadian S, Nemat-Gorgani M*
Inhibition of amyloid fibrillation of lysozyme by indole derivatives: possible mechanism of action
FEBS Journal 274, 6415-6425 (2007)
<https://doi.org/10.1111/j.1742-4658.2007.06158.x>
- 36- Ramshini H, **Rezaei-Ghaleh N**, Ebrahim-Habibi A, Saboury AA, Nemat-Gorgani M*
Thermally induced changes in the structure and activity of yeast hexokinase B
Biophysical Chemistry 137, 88-94 (2008)
<https://doi.org/10.1016/j.bpc.2008.07.004>
- 37- **Rezaei-Ghaleh N**, Ramshini H, Ebrahim-Habibi A, Moosavi-Movahedi AA, Nemat-Gorgani M*
Thermal aggregation of α -chymotrypsin: role of hydrophobic and electrostatic interactions
Biophysical Chemistry 132, 23-32 (2008)
<https://doi.org/10.1016/j.bpc.2007.10.001>
- 38- Ghaemi M*, **Rezaei-Ghaleh N**, Asgari Y
Lattice Gas Automata Simulation of 2D site-percolation diffusion: Configuration dependence of the theoretically expected crossover of diffusion regime
In: **Lecture Notes in Computer Sciences** 5191, 274-281 (2008)
Click [here](#) for the article.
- 39- **Rezaei-Ghaleh N**, Ebrahim-Habibi A, Moosavi-Movahedi AA, Nemat-Gorgani M*
Effect of polyamines on the structure, thermal stability and 2,2,2-trifluoroethanol-induced aggregation of α -chymotrypsin
International Journal of Biological Macromolecules 41, 597-604 (2007)
<https://doi.org/10.1016/j.ijbiomac.2007.07.018>
- 40- **Rezaei-Ghaleh N**, Ebrahim-Habibi A, Moosavi-Movahedi AA, Nemat-Gorgani M*
Role of electrostatic interactions in 2,2,2-trifluoroethanol-induced structural changes and aggregation of α -chymotrypsin
Archives of Biochemistry and Biophysics 457, 160-169 (2007)
<https://doi.org/10.1016/j.abb.2006.10.031>
- 41- Hedayati M*, Nabipour I, **Rezaei-Ghaleh N**, Azizi F
Germline RET mutations in exons 10 and 11: an Iranian survey of 57 medullary thyroid carcinoma cases
Medical Journal of Malaysia 61, 549-569 (2006)
Click [here](#) for the article.
- 42- Ghanbarian A, **Rezaei-Ghaleh N**, Salehi P, Azizi F
Blood Pressure Distribution in an Iranian adolescent population: "Tehran Lipid and Glucose study"
Medical Journal of Malaysia 61, 433-437 (2006)

Click [here](#) for the article.

43- Ghaemi M*, **Rezaei-Ghaleh N**, Sarbolouki MN

Directed Ligand Passage Over the Surface of Diffusion-Controlled Enzymes: A Cellular Automata Model

In: **Lecture Notes in Computer Sciences** 3305, 719-724 (2004)

Click [here](#) for the article.

44- **Rezaei-Ghaleh N***

Signaling in biological systems: insights from communication theory

Journal of Theoretical Biology 224, 411-412 (2003)

[https://doi.org/10.1016/s0022-5193\(03\)00171-1](https://doi.org/10.1016/s0022-5193(03)00171-1)

• **ACADEMIC PEER REVIEWING ACTIVITIES**

- Reviewing grant proposals for the “National Research Agency, **AGENCE NATIONALE DE LA RECHERCHE (ANR)**”, the main institution of France for funding scientific research.
- Evaluating research articles for the Italian National Agency for the Evaluation of the University and Research Systems (**ANVUR**), as part of the Evaluation of Research Quality 2015-2019 (**VQR 2015-2019**) program.
- Reviewing manuscripts for journals of “**American Chemical Society, ACS**”, “**Royal Society of Chemistry, RSC**”, “**Frontier**”, “**MDPI**” and other publications.

• **MEMBERSHIPS OF SCIENTIFIC SOCIETIES**

2019 – *Present*: Member of the “International Society of Magnetic Resonance (ISMAR)”

2013 – *Present*: Member of the “Society of German Chemists”, the group of “Magnetic Resonance Spectroscopy”

2015 – 2016: Member of International Society for Computational Biology.

• **SELECTED HONORS, AWARDS AND CAREER HIGHLIGHTS**

1. Renewed German Research Foundation (DFG) grant (ca. 330k €), awarded in 2021 for the 3-years extension of a Principal Investigator position and research;
2. German Research Foundation (DFG) grant (ca. 290k €), awarded in 2017 for a temporary (3 years) Principal Investigator position and research;
3. “Inge- und Fritz-Kleekamm-Forschungspreis” award (ca. 5k €), as the co-first author of a paper published in *Acta Neuropathol* (shared with two other co-first authors).
4. World outreach travel award (1000 €) to attend the European Conference on Mathematical and Theoretical Biology (Dresden, 2005);
5. Herbert D. Landahl’s travel award (1000 \$) to attend the annual meeting of the Society for Mathematical Biology (Dundee, 2003);
6. Ranked 4th in the nation-wide Iranian *University Entrance Examination* in 1990 among ~ 300,000 participants.