April 16, 2025

Call for a Postdoctoral Fellow for Professor Nadinath Nillegoda's Lab

Keio University WPI Human Biology-Microbiome-Quantum Research Center (Bio2Q)

1 About PI

Name and Title:
NADINATH B. NILLEGODA, Project Professor, Keio University Bio2Q

Specialization:
Proteostasis, Cell Repair, Protein Quality Control, Protein Disaggregation, Molecular Chaperones

Website:
Under construction
Please refer to the following page for postdoctoral position application.
https://bio2q.keio.ac.jp/wp-content/uploads/2_Postdoc.pdf

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2 Research Fields and Host Laboratory

Our laboratory's overarching research focuses on protein quality control pathways that help maintain cellular proteostasis (protein homeostasis) and promote cell repair after protein damage. My group pioneers in the emerging field of primate proteostasis, being the first to investigate how primate-specific adaptations in the proteostasis network influence cell repair and deepen our understanding of human diseases related to protein aggregation and aging.

In close collaboration with world-renowned scientists at Bio2Q, we will lead research into intestinal microbiota-epithelial crosstalk through the lens of proteostasis (from both the host and microbial sides), aiming to uncover novel primate-specific mechanisms and pathways that protect our gut barrier integrity after proteotoxic damage caused by dysbiosis. Proteotoxic stress in the intestinal epithelial tissue, often triggered by metabolites released during microbial imbalances, can lead to massive oxidative damage to proteins, resulting in the formation of toxic aggregates. These toxic aggregates can disrupt cell function, often leading to cell death, which could further impair gut barrier function and exacerbates inflammatory diseases such as inflammatory bowel disease (IBD), colitis, and metabolic disorders. Our work has the exciting potential to drive advancements in treating these gut-related diseases and improve gut health.

One main area of research delves into exploring strategies to enhance protein disaggregation (aggregate solubilization) in our cells to counteract toxicities associated with protein aggregation. We have uncovered several novel primate-

specific protein quality control pathways that boost the assemble of protein disaggregases (molecular machines that disassemble aggregated proteins). We are currently using multidisciplinary approaches (some through collaborations) including cell biology, molecular biology, evolutionary biology, biochemistry and structural biology, machine learning with a strong focus on characterizing novel mouse models with enhanced protein disaggregation function to investigate the impact of these primate-specific adaptations in proteostasis in disease (including dysbiosis related disorders and neurodegeneration) and aging.

3 Job Description

We are seeking a talented, dedicated, and energetic Postdoctoral Fellow with extensive experience in mouse and cell biology, molecular biology, cell/tissue imaging techniques to lead new research initiative(s) that study the role of the primate-specific adaptations in protein disaggregation and their impact on aggregate solubilization/cell repair along the gut-brain axis. The applications of this work center on combating dysbiosis and neurodegeneration. This exciting and high-impact research direction presents unique opportunities for rapid, groundbreaking discoveries that could significantly enhance healthy aging. While prior experience in proteostasis, gut microbiome, neuroscience, stem cell biology or related fields is advantageous, it is not required.

The candidate will work closely with the Principal Investigator and collaborate effectively with team members to achieve experimental goals. Our team closely collaborates with world-renowned experts in the gut microbiome, stem cells and organoid biology and neuroscience at Bio2Q to achieve the above-mentioned research goals. These collaborations offer the candidate access to cutting-edge techniques and skills for use in his/her research. Importantly, a key focus will be on developing the candidate's career path in science. Additionally, the candidate will have the opportunity to undertake research stays in Switzerland and the USA to further enhance their research objectives.

4 Number of Openings

One

5 Qualifications

Applicants must fulfill the following requirements:

1. **PhD degree**: Applicants must have been awarded a PhD in a relevant field (e.g. Proteostasis, stem cell biology, gut microbiome, neuroscience, or related fields. Candidates with a strong background in cell biology and mouse studies will also be considered).
2. **Research accomplishments**: A good track record of research achievements. A first-author research article in a reputable journal is recommended. Candidates with first-author manuscripts currently in review will also be equally considered.
3. **Start date**: The candidate must be available to start between April 1, 2025, and July 31, 2025. *The exact dates are negotiable.*
4. **Expert knowledge & skills**: Demonstrated expertise in areas related to mouse models, cell biology, molecular biology, cell/ tissue imaging. Having exposure in proteostasis, gut microbiome, stem cell biology and/or neuroscience research will be advantageous, but not necessary.

5. **Interest & motivation**: A strong interest in the research outlined and the ability to independently design, execute, and analyze experiments.
6. **Communication skills**: Verbal and written communication skills in English are essential, as the candidate will be required to present findings to both internal teams and external collaborators.
7. **Collaboration & coordination**: Excellent interpersonal skills and the ability to coordinate and collaborate effectively with other research teams, both within and outside the institution.
8. **Basic computer skills**: Proficiency in standard computer applications and experience with data analysis software.
9. **Adaptability & problem-solving**: The ability to think critically and independently, while adapting to new challenges and solving complex problems in experimental design and execution.
10. **Passion for career development**: We are committed to the professional growth of our postdoctoral fellows. The candidate should have a clear interest in pursuing a successful academic or industry career and actively engage in career development opportunities.
11. **Organizational skills**: Ability to manage multiple tasks and deadlines efficiently, while maintaining attention to detail in experimental protocols and data management.