Yenah Bak

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Education

Seoul National University (SNU) | Seoul, South Korea

Bachelor of Science & Bachelor of Arts [Biological Sciences / Psychology]   **Feb. 2024**

Publication

1. **Yenah Bak**, Kim, D. (In Preparation). "Serotonergic signaling regulates motor balance during stress."

2. **Yenah Bak**, Kim, D. (In Preparation). [Review paper] "Beyond Reciprocality: How Central States Coordinate the Loop Between Physiology and Feeling"

Conference Presentations

1. **Yenah Bak,** S. Lee, J. Jeong, D. Kim (2024). *Serotonergic regulation of fastigial nucleus for muscle activity* regulation No. PSTR347.03 Poster presentation at the **Society for Neuroscience (2024)** Annual Meeting, Chicago, IL.

2. **Yenah Bak**, H Kim, Sungyon Kim. (2022). *Observation of Physiological Gastric Distension-activated Neural Population.* Oral and Poster presentation at the SNU Undergraduate Research Symposium.

Research Experiences

Korea Advanced Institute of Science & Technology (KAIST) | Daejeon, South Korea **Research Associate** (Advisor: Dr. Daesoo Kim) | *Apr 2024 – Present*

Primary Project: Functional dissociation of serotonergic regulation of motor

- Lead an independent project investigating the role of the serotonergic system in motor function regulation.
- Conducted fiber photometry, calcium and serotonergic biosensor recording, experiments to monitor real-time serotonergic activity during stress and reward paradigms.
- Perform gait analysis and electromyography recording to identify a distinct subpopulation of serotonergic neurons that modulate motor functions.
- Manuscript in preparation (first author)

Collaboration Project: Visual circuit principle of chase problem in hunting

- Conducted stereotaxic surgery for optogenetic modulation during hunting trials
- Neural circuit tracing with Pseudorabies virus to validate topological connectivity
- Manuscript in preparation (middle author)

NeuroTobe Pharmaceuticals | Daejeon, South Korea **Researcher** (Advisor: Dr. Sujin Chae) | *Jul 2023 – Mar 2024*

Project: Computational analysis of behavioral phenotypes for drug efficacy in transgenic mice

- Transitioned from standard behavioral scoring to high-dimensional data analysis to quantify drug effects on a transgenic mouse model.
- Integrated the **SUBTLE temporal analysis framework** to capture temporal components in animal behavior that were limited via standard UMAP analysis method.
- Monitor drug effects on muscle activity with electromyography recording.

Seoul National University (SNU) | Seoul, South Korea **Undergraduate Researcher** (Advisor: Dr. Alan Jung Park) | *Jan 2023 – Mar 2023*

- **Lab Establishment:** Assisted in the initial setup of laboratory infrastructure, including the procurement and calibration of stereotaxic, Deeplabcut analysis protocol, behavioral equipment.
- **Protocol Development:** Optimized standard protocol and procedures for rodent stereotaxic surgery and behavioral phenotyping.

Seoul National University (SNU) | Seoul, South Korea **Undergraduate Researcher** (Advisor: Dr. Sung-yon Kim) | *Jul 2021 – Dec 2022*

Project: Mapping neural circuits of mechanosensory feedback in feeding behavior.

- Awarded the **SNU Undergraduate Research Grant** to lead a project on stomach-distension feedback loops.
- Utilized **c-fos immunohistochemistry** to screen brain-wide neural activation following physiological stomach distension.
- Characterized specific inhibitory feeding circuits projecting from the **parabrachial nucleus (PBN)** to downstream targets, including the **periaqueductal gray (PAG)** and **paraventricular hypothalamus (PVH)**.
- Designed and optimized behavioral protocols to isolate physiological variables in mechanosensory feedback.

Selected Academic Projects

Language Model Implementation (C Language) | *Applied Experimental Psychology (Fall 2022)*

- **Algorithm Design:** Programmed a multi-layer neural network from scratch in **C** to simulate grapheme-to-phoneme conversion (learning to pronounce words).
- **Project:** Implemented error-correction learning algorithms (backpropagation algorithm) to minimize output error.
- **Relevance:** Established the fundamental understanding of computational modeling and high-dimensional data processing that was subsequently applied to the **SUBTLE** analysis at NeuroTobe.

Honors & Awards

- SNU Undergraduate Research Grant (Project: Observation of Physiological Gastric Distension-activated Neural Population) | *2022*
- SNU Undergraduate Research Grant (Project: Comparative Analysis of UK/Korea Mental Health Systems) | *2019*

Skills & Techniques

Wet Lab & Physiology

- **In vivo physiology:** Fiber Photometry (calcium imaging), Stereotaxic Surgery (Optogenetics, chemogenetic, gastric balloon)
- **Histology:** Immunohistochemistry (IHC), c-Fos mapping, Perfusions, Vibratome/Cryotome, PRV circuit tracing
- **Behavioral Assays:** Gait analysis, Anxiety paradigms (Open Field, EPM), Behavioral test, Feeding assays.

Computational & Data Analysis

- **Programming:** Python, MATLAB
- **Analysis:** Dimensionality Reduction (UMAP), SUBTLE framework
- **Tools:** ImageJ/Fiji, GraphPad Prism, Adobe Illustrator (for figure creation).