

Khaled Metwally



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Languages

Arabic – native

English– C1 Advanced

Japanese – A1 Intermediate

Summary

As a biotechnologist, my expertise in microbial genetics and bioinformatics fuels my unwavering enthusiasm for leveraging cutting-edge bioinformatic tools to decipher the complex molecular pathways that govern a wide range of physiological conditions, including stress resilience and disease characterization. My profound interest lies in harnessing my extensive experience in transcriptomics and proteomics in the fields of synthetic biology and metabolome engineering. Moreover, I am very interested in the electrogenetics and optogenetics which are nascent reserach and how it could be applied in controlling the biological systems which can be designed by the means of synthetic biology techniques. I have the motivation to get experience in this field of research and how it could be applied especially in the industrial field.

Skills

Bioinformatics and RNA-Seq analysis

- Good user of Shell Pipelines in UNIX
- Good user of Trinotate Pipeline
- Good user of RAPT pipeline (Read, assembly, and annotation pipeline) developed by NCBI
- Good user of GALAXY and PATRIC platforms
- Good user of R (DeSeq2 and Edger packages in differential gene expression (Bioconductor packages), ggplot2)
- Good user of Chimera X

Proteomics

- Bacterial two hybrid system in studying protein-protein interaction
- Protein docking and application of QSAR models using MOE software
- Western-blotting.
- Macromolecular crowding technique

Microbiology and Microbial genetics

- All the fundamental techniques and skills for microbiology including isolation, screening, identification, etc.
- Gene transformation using Escherichia coli and Saccharomyces cerevisiae.
- Designing of cloning vectors.
- Good experience in operating automated fermenters.
- Co-expression, Design of restriction enzymes map.

Other Computational Biology Skills

- Software for Sequence Analysis, Annotation and Prediction: Blast2Go, Geneious R8 and DNA lasergene Package™
- MEGA X and MEGA 11, Genome Browser (<http://www.ensembl.org/index.html>) and UCSC Genome Browser (<http://genome.ucsc.edu>).

Work Experience

1. Assistant Professor in Department of Genetics, Faculty of Agriculture Ain Shams University (Cairo- Egypt) (27-9-2021 till now)

Duties and responsibilities

- Developed in-depth lectures based on books, personal research and course objectives to drive student learning.
- Created brand new course offerings for both undergraduate and graduate students.
- Supported graduate students in selecting research topics, planning projects and meeting graduation requirements.
- Held office hours each week to help struggling students learn materials and improve performance.
- Presented at conferences, providing expertise and maintaining academic credibility.
- Mentored students, providing guidance on research projects and academic development.
- Assigned exams and projects, measuring learning outcomes and performance.

2. Research Assistant in Department of Biological Function Engineering, Kyushu Institute of Technology (Fukuoka-Japan) (20-4-2018 to 25-3-2021)

Duties and responsibilities

- Working on PhD research targeting and designing function peptides in tolerating environmental stress.
- Completed data collection, literature reviews and analysis to contribute to ongoing scholarly projects.
- As a senior PhD student I was aiding other students conducting their bachelor and master studies.

3. Teaching Assistant in Department of Genetics, Faculty of Agriculture Ain Shams University (Cairo-Egypt) (8-5-2016 to 19-4-2018)

Duties and responsibilities

- Assisted lead teacher with grading assignments, maintaining records and preparing for class sessions.
- Preparing practical sections for undergraduate students.
- Teaching the concepts and principles of the experiments.
- Conducting the experiments related with the taught courses.
- Supported students' academic progress by providing one-on-one attention to help guide learning and comprehension.

4. Demonstrator in Department of Genetics, Faculty of Agriculture Ain Shams University (Cairo-Egypt) (28-1-2010 to 7-5-2016)

Duties and responsibilities

- Worked with coordinators to monitor participant preparations and follow-ups to avoid miscommunications.
- Conducting M.Sc. experiments and research.
- preparing the practical sections.

. Education

1. **PhD: Biological Function Engineering (March 2021)**
From **Kyushu Institute of Technology, Graduate School of Life Science and Systems Engineering (Fukuoka-Japan).**
2. **M.Sc. in Agricultural Science (Genetics) (February 2016)**
From **Faculty of Agriculture, Ain Shams University (Cairo-Egypt).**

. Fellowships

- **JASSO (Monbukagakusho Honors Scholarship for Privately-Financed International Students).** For Ph.D. study April 2018.
- **JASSO (Follow-up research Fellowship PostDoc.) for 3 months 10/2024 to 01/2025.**
- **Egyptian Embassy Post-doctoral fellowship (JICA) for 6 months 02/2025 to 8/2025.**
- **Research Grant, Japan Society for the Promotion of Science, Grant Number: 22K04844**

. Publications

- **Metwally, K.,** and Ikeno, S. (2025). A Short Peptide Derived from Late Embryogenesis Abundant Proteins Enhances Acid Tolerance in *Escherichia coli* via Modulation of Two-Component Regulatory Systems. **FEBS Journal.**
- Selatnia, I., Sid, A., Lgaz, H., Bouhraoua, A., Roisnel, T., Khamaysa, O. M. A., Kansız, S., **Metwally, K.,** Soliman, A.G., Lee, H.S. and Boudiba, S. (2025). Synthesis, structural characterization, and biological evaluation of novel iodophenyl-anthracene Schiff bases: Insights from X-ray crystallography, DFT, antibacterial, and molecular docking studies. *Journal of Molecular Structure*, 144066.
- El-Kattan, N., Ibrahim, M. A., Emam, A. N., **Metwally, K.,** Youssef, F. S., Nassar, N. A., and Mansour, A. S. (2025). Evaluation of the antimicrobial activity of chitosan-and curcumin-capped copper oxide nanostructures against multi-drug-resistant microorganisms. *Nanoscale Advances*, 7(10), 2988-3007.
- ALLAH, M. S. A., IBRAHIM, S. A., RAZIK, A. B. A., SOLIMAN, S. M., and **METWALLY, K. A.** (2023). MOLECULAR PROFILING AND GENETIC DIVERSITY OF SHEEP POX AND LUMBY SKIN DISEASE VIRUS. *Egyptian Journal of Genetics And Cytology*, 52(2), 109-129.
- Khater, H. M., Abd Elaziz, Y. S., Khafaga, A. F., Abdel-Razik, A. B., Ibrahim, S. A., and **Metwally, K.** (2023). Morphological and Molecular characterization of Physical and Chemical Mutations on Durado Plum Cultivar. *Horticulture Research Journal*.
- Kamel, A. M., **Metwally, K.,** Sabry, M., Albalawi, D. A., Abbas, Z. K., Darwish, D. B. Al-Qahtani, S.M., Al-Harbi, N.A., Alzuaibr, F.M. and Khalil, H. B. (2023). The Expression of *Triticum aestivum* Cysteine-Rich Receptor-like Protein Kinase Genes during Leaf Rust Fungal Infection. *Plants*, 12(16), 2932.
- Abdelkader, M. F., Mahmoud, M. H., Abdein, M. A., **Metwally, K.,** Ikeno, S., and Doklega, S. M. (2022). The Effect of combining post-harvest calcium nanoparticles with a salicylic acid treatment on cucumber tissue breakdown via enzyme activity during shelf life. *Molecules*, 27(12), 3687.

- Farrag, H. N., **Metwally, K.**, Ikeno, S., and Kato, T. (2020). Design and synthesis of a new amphipathic cyclic decapeptide with rapid, stable, and continuous antibacterial effects. *Pertanika J. Sci. Technol*, 28(10.47836).
- **Metwally, K.**, and Ikeno, S. (2020). A short peptide designed from late embryogenesis abundant protein enhances acid tolerance in *Escherichia coli*. *Applied biochemistry and biotechnology*, 191, 164-176.
- **Metwally, K.**, Soliman, K., El-Razek, A., & Ibrahim, S. (2018). The Effect of Fermented Broth of *Azospirillum spp.* Wild and Mutant Types on In-vitro Propagation of *Paulownia tomentosa*. *IOSR Journal of Biotechnology and Biochemistry*.

In publication

- **K. Metwally**, S. Nakamura, and S. Ikeno. (2026). Clarification of the LEA like peptide interaction with the Rcs signaling pathway during the oxidative stress in *Escherichia coli*. *Journal of Molecular Structure*.
- Samah H. Abu-Hussein, M. K. M. Ali, Muhammad A. Khan, A. I. Aljameel, Ahmed. G. Soliman, Motahher A. Qaeed, Ammar AL Farga, and **Khaled Metwally**. (2026). Bioorganic Synthesis and Structure-Activity Relationships of Origanum vulgare-Functionalized Zinc Oxide Nanoparticles: Phytochemical Profiling and Antimicrobial Mechanisms. *Journal of Bioorganic Chemistry*.

Books

- **Carbon Nanotubes in Plant Growth and Stress Tolerance: Unique Properties.** (Accepted, and in CRC Press, Boca Raton, Florida, USA (Taylor & Francis Group), Chapter 5 “Carbon Nanotubes Engineering Superabsorbent Material for Agriculture Application”.
- **Carbon Nanotubes in Plant Growth and Stress Tolerance: Unique Properties.** (Accepted, and in CRC Press, Boca Raton, Florida, USA (Taylor & Francis Group), Chapter 10 “Economic Impact of Carbon Nanotubes on Crop Production and the Ecosystem”.

Conferences and Seminars

- **5/7/2025** – Kyushu Joint Conference of Chemical-related branches 62th. **Loading Short LEA Peptides on Different Nanoparticle Systems: Characterization and Impact on Plant Stress Tolerance.** (Conference-Poster).
- **25/9/2024** – The international Symposium held by Research Center for Synthetic Biology (RCSB). Iizuka, Fukuoka, Japan. **Genetic Improvement of Some Egyptian Rice Varieties (*Oryza sativa* L.)** (Oral Presentation).
- **26/9/2023** – The international Symposium held by Research Center for Synthetic Biology (RCSB). Iizuka, Fukuoka, Japan. **Utilizing Curcumin and Chitosan-Capped Copper Oxide Nanoparticles for Combatting Multi-Drug Resistant Microorganisms** (Oral Presentation).
- **28/9/2022 – 29/9/2022** – The international Symposium held by Research Center for Synthetic Biology (RCSB). Iizuka, Fukuoka, Japan. **Identification of Receptor-Like protein kinases in leaf rust resistant wheat near isogenic lines based on Transcriptomic analysis** (Oral Presentation).

- **11/11/2019 – 12/11/2019** – 7th international Symposium on Applied Engineering and Sciences (SAES), Universiti Putra Malaysia. **LEA peptide expression assures survival of *Escherichia coli* in acidic conditions** (Oral Presentation).
- **01/07/2019 – 04/07/2019** – 14Th Asian Congress on Biotechnology (ACB 2019), Taipei-Taiwan. **LEA Peptide Confer Tolerance to Low pH in *Escherichia coli*** (Oral Presentation).
- **15/12/2018 – 16/12/2018** – 6Th international symposium on Applied Engineering and Sciences (SAES). Tobata, Fukuoka, Japan. **The effect of mutated LEA peptide over acid tolerance in *Escherichia coli*** (Oral Presentation).
- **12/11/2018 – 12/11/2018** – 11Th Japan-Korea Joint Symposium on Bio-microsensing technology (JKBT). Kokura, Fukuoka, Japan. **LEA peptide prevents *E. coli* death under acidic pH conditions** (Poster Presentation).
- **5/10/2016 – 8/10/2016** – 4Th International Conference of Genetic Engineering and Its Applications. Sharm-Alshikh, Egypt. **Genetic Improvement of Some Nitrogen fixing Plant Growth Promoting Bacteria** (Oral Presentation).