



Khaled Youssef Kamal Moustafa

(Khaled Y. Kamal)

Assistant Research Scientist– Space Molecular & cellular Biology



Space biology research has the goal of using space environment as a tool to understand the influence of gravity on functional processes of living organisms for the future space exploration. I am interested in comprehending the consequences of these environmental changes on the molecular and cellular processes in both Eukaryotes (Plants, Microorganisms, and Animals) under both spaceflight and Ground based facilities. Also using the cellular, genomic, proteomic and bioinformatics resources and tools to identify proteins, gene, and specific networks related to the gravitational alterations is crucial for future space exploration.

EXPERIENCE



Texas A&M University
2020 – now

Assistant Research Scientist, Redox Biology & Cell signaling, Health & Kinesiology Department, Texas A&M university, Texas, US
Studying novel mechanism in Assembly of Nox2 and skeletal muscle Atrophy with Spaceflight microgravity

Palacký University
2019

Junior researcher– Faculty of Science, Palacký University, Olomouc, Czech Rep.
Polymorphism and GWAS Association Analysis Related to abiotic stress tolerance using Genome Editing Technique by CRISPR/Cas9

Zagazig University
2015-2019

Assistant Professor– Faculty of Agriculture, Zagazig, EGYPT.
Lecturer on plant breeding and genetics – crop physiology – biostatistics.
Chromatin remodeling – Epigenetics regulate plant response to abiotic stress

Université de Toulouse II
2016-2017

Post-doctoral fellow at Laboratoire de Recherche en Sciences Végétales, Université de Toulouse II, Toulouse, FRANCE.
Role of the calcium-dependent protein kinase CPK3 and nuclear calcium in Fumonisin B1-induced programmed cell death.

CIB-CSIC
2010-2015

PhD Thesis CIB-CSIC, Madrid, SPAIN.
PhD thesis on the alterations caused by microgravity on the plant developmental processes using *Arabidopsis thaliana* cell culture.

ESA-NASA
2010-2015

Visiting PhD student as a part of NASA – ESA joint Projects to use different Ground based Facilities to simulate microgravity.
ESTEC-ESA (Noordwijk, The NETHERLANDS), Florida University, Eadbound University, German Aerospace Center DLR.



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Education

PhD
December, 2014

Master
June, 2012

Bachelor
June, 2007

Doctorate in Biology "Excellent with CUM LAUDE"
Faculty of Biology, University of Complutense, SPAIN

Master of Science in Genetics and Cellular Biology
Department of Genetics, University of Complutense, SPAIN

Bachelor of Science in Agronomy (Crops Breeding and Genetics) "GPA = 3.9"
Department of Agronomy, Zagazig University, EGYPT

FELLOWSHIPS AND AWARDS

DAAD-EXCEED

TWAS-ARO
Alexandria 2018

IFE- STDF Cooperation
France 2016

National Academy of Sciences,
USA. Zagazig, 2015

JAE-PreDoc, CSIC, Spain.
Madrid, 2010-2014

European Space Agency
(ESA), The Netherlands.
Leiden, 2014

ASGSR American Society for
Gravitational and Space
Research, Orlando, 2013

The European Low Gravity
Research Association
(ELGRA), Rome, 2013

FAPESP Foundation, Brazil.
São Paulo, 2009

SMHI-SIDA fellowship,
Sweden. Norrköping, 2009

Egyptian Ministry of
Education, Egypt

Space life science for earth life science excellence award

Science in Diplomacy fellowship

Postdoctoral grant funded by the French Government and STDF to implement research in LRSV – CNRS- University of Toulouse III – France.

Fellowship to help implement teaching of responsible science; Professionalism in science: Conducting research responsibly.

Four years fellowship from the Spanish National R+D Program (Ministry of Science and Innovation), to prepare Master and PhD degrees in the CIB-CSIC.

Short stay fellowship (3 month) for conducting scientific experiments in Space Plant Biology) by ESA-GIA project in the ESA technical and technology center (ESTEC).

Travel grant "Student Competition"

Travel grant "Student Competition"

Short stay fellowship (6 months) for Identification of new morphological and physiological parameters associated with drought tolerance in sugarcane.

The advanced international training program on Climate Change - Mitigation and Adaptation for community planners and decision makers in developing countries.

Fellowship for Undergraduate studies by Egyptian Ministry of Education, Egypt (Zagazig, 2004-2007).

TECHNICAL EXPERIENCE

Greenhouse and Field Experiments	Eukaryotic systems (mainly Arabidopsis), Plant seedling, cell cultures (Cell suspension, semisolid callus), transgenic systems and cultures.
Space Biology Research	Spaceflight Preparation – Parabolic Flight – Drop Tower – Sound Rocket – 2D Clinostat – RPM – LDC – Bioreactor - Magnetic Levitation.
Cell Biology	Flow cytometry, Immunofluorescence, Nuclei Isolation, Microscopy (Confocal Microscopy, Contrast Microscopy, Electron Microscopy and in vivo multi-dimensional microscopy).
Molecular Biology and Genetics	PCR, DNA analysis on agarose gels ,molecular cloning and DNA sequencing, RT-qPCR, Microarrays, protein expression and purification, mutants.
Proteomics	Protein Extraction - Immunoprecipitation Protocol. SDS-Polyacrylamide gel electrophoresis, SDS-PAGE, Western Blot.
Bioinformatics	R-Bioconductor, Cytoscape, GeneMANIA, GEDI clusters, STRING networks.
Statistical analyses	SPSS, MSTAT, Sigma plot.
Languages	English (fluent), Spanish (v. good), French (Beginner) and Arabic (native).



MANAGEMENT & COLLABORATION

Lab Management and Groups collaborations

- Over than 7 years of scientific space biology research involving in multi-projects funded by ESA and NASA.
- **Master and PhD in cellular Biology (Space Biology program funded by ESA).**
- Experience with European Space Research and Technology Centre (ESTEC) community environment for space mission.
- Experience with the spaceflight experiments using plant seedling (Space X9 – Seedling Growth 1 Project – NASA-ESA collaboration).
- Experience with Ground Based facilities for the gravitational alterations (LDC for Hypergravity, RPM and pipette clinostat for micro-partial gravity).
- Experience with Testing and technical Reviewing microgravity simulators to be used on Earth for the first time.
- Knowledge with the ISS environment for biological experiments).
- Experience with Space biology Experimental design and preparation.
- Experience on space biology project with various groups and languages.
- Experience with space biology Experimental design, preparation, running, data collect, data analysis and discussion.
- Experience with space biology reports preparation, proposal writing, manuscripts preparation and submission.
- **Hard worker, Social Motivations, Technical skills, communication skills, management skills.**



PARTICIPATION IN FUNDED RESEARCH PROJECTS

NASA (ROSBio 2018)
(80NSSC19K0432)

Upstream Regulation of Nox2 and Skeletal Muscle Atrophy During Spaceflight
PI: Dr. John Lawler (2019-2022)

NASA HERO (Human
Exploration Research) 16-
16Flag1_2-0043

Attenuation of Space Radiation-induced Pro-oxidant and Fibrotic Signaling in
the Heart by Nutritional and Genetic Interventions: Adventures in Tissue
Sharing. PI: Dr. John Lawler (2017-2020)

MBR Space Settlement
Challenge - Seed Grants for
Ambitious Space Settlement
Concepts- Dubai Future
Foundation

Initial assessment of the nutritional quality of the Brassica Species Microgreens
under altered Gravity as a component of Space Life Support Systems. PI: Dr.
Khaled Kamal (2018).

Institut francais d'Egypte (IFE)
+ Science & Technology
Development in Egypt (STDF)

Role of the calcium-dependent protein kinase CPK3 and nuclear calcium in
Fumonisin B1-induced programmed cell death. PI: Dr. Christian Mazars / Dr.
Khaled Kamal (2016/2017).

The U.S. National Academies
of Sciences (NAS).

Professionalism in science: Conducting research responsibly. PI: Dr. Khaled
Kamal. (2015/2016).

STDF:: Science & Technology
Development Fund in Egypt

Eukaryotes Cellular and Molecular genetics aspects to the Climate change. PI:
Dr. Setohy (2015/2020)

Ministerio de Ciencia y
Tecnología. Programa Nacional
del Espacio en Espana.

Functional alteration on plants caused by the microgravity in the space and on
Earth as a part of European multi-laboratories. AYA2009-07952. PI: Dr. F.
Javier Medina (2010-2014).

European Space Agency

Systematic Evaluation of the ground based (micro-) gravity simulation
paradigms available in Europe. First Phase: Similarities and Differences
between the different approaches. PI: Dr. Raúl Herranz Barranco (2010-2013).

European Space Agency
(Mission to the International
Space Station)

GIA Project: From GBF to ISS with *A. thaliana*: Utilization of ground based
microgravity simulation to improve the scientific knowledge and expected
returns from already approved experiments to be performed with *Arabidopsis*
thaliana in the ISS. PI: Dr. F. J. Medina / Dr. Raul Herranz (2011-2014).

ESA and NASA programs.

Plants in the International Space Station (ISS). Investigations in Earth and
Space in ESA and NASA programs. PI: Dr. F. J. Medina (2013-2015).

In preparation &
Submitted

John M. Lawler, Jeffrey M. Hord, Pat Ryan, Dylan Holly, Mariana Janini Gomes, et al, **Khaled Y Kamal** (2021). *Nox2 Inhibition Regulates Stress Response and Mitigates Skeletal Muscle Fiber Atrophy during Simulated Microgravity*. [Int. J. Mol. Sci. 2021, 22, 3252.](#) **(IF = 4.59)**

John M. Lawler, Rachel E. Botchlett, Shih Lung Woo, Honggui Li, Jeff M. Hord, James D. Fluckey, Amin Mohajeri, **Khaled Y. Kamal**, and Chaodong Wu (2020). *Metformin-sensitive Effects of a High-Fat Diet on Skeletal Muscle Morphology and Sarcolemmal Protein Signaling in Young Mice*. [Submitted in Nutrition Research.](#)

Published in 2020

Khaled Y. Kamal, Mortaza Khodaeiaminjan, Galal Yahya, Ahmed A. El-Tantawy, Daa Abdel Moneim, Mohamed A. El-Esawi, Mohamed A. A. Abd-Elaziz, Amr A. Nassrallah (2021). *Modulation of cell cycle progression and chromatin dynamic as tolerance mechanisms to salinity and drought stress in maize*. *Physiol Plant*. doi: 10.1111/ppl.13260. **(IF = 4.148)**

Published in 2019

Khaled Y Kamal, M. Khodaeiaminjan, A. A El-Tantawy, et al (2020). *Evaluation of growth and nutritional value of Brassica microgreens grown under red, blue and green LEDs combinations*. [Physiologia Plantarum.](#) DOI: 10.1111/ppl.13083 **(IF= 4.148)**

Kamal KY, Herranz R, van Loon J J W A, Medina FJ. (2019). *Differential transcriptional profile through cell cycle progression in Arabidopsis cultures under simulated microgravity*. [Genomics.](#) DOI:10.1016/j.ygeno.2019.01.007 **(IF= 3.327)**

Published in 2018

Mélanie Ormancey, Patrice Thuleau, Renier A.L. van der Hoorn, Sabine Grat, Ambroise Testard, **Khaled Y. Kamal** Marie Boudsocq, Valérie Cotelle, and Christian Mazars. (2019). *Sphingolipid-induced cell death in Arabidopsis is negatively regulated by the papain-like cysteine protease RD21*. [Plant Science, 2018, \(280\), 12-17.](#) **(IF= 3.712)**

Kamal KY, Herranz R, van Loon J J W A, Medina FJ. (2018). *Cell cycle acceleration and changes in essential nuclear functions induced by simulated microgravity in a synchronized Arabidopsis cell culture*. [Plant, cell and Environment](#), DOI: 10.1111/pce.13422 **(IF= 6.173)**

Published in 2017

Kamal KY, Herranz R, van Loon J J W A, Medina FJ. (2018). *Simulated microgravity, Mars gravity, and 2g hypergravity affect cell cycle regulation, ribosome biogenesis, and epigenetics in Arabidopsis cell cultures*. [Scientific Reports volume 8, Article number: 6424](#), DOI: 10.1038/s41598-018-24942-7 **(IF= 4.122)**

Published in 2016

Kamal KY, Herranz R, van Loon J J W A, Medina FJ. (2017). *Embedding Arabidopsis Plant Cell Suspensions in Low-Melting Agarose Facilitates Altered Gravity Studies*. [Microgravity Sci. Technol, \(29\):115-119.](#) **(IF= 1.357)**

Kamal KY, Herranz R, van Loon J J W A, Christianen P C M, Medina FJ. (2016). *Evaluation of Simulated Microgravity Environments Induced by Diamagnetic Levitation of Plant Cell Suspension Cultures*. [Microgravity Sci. Technol. \(28\): 309-317.](#) **(IF= 1.357)**



PUBLICATIONS

Published in 2015

Herranz R, Valbuena MA, Manzano A, **Kamal KY**, Medina FJ. (2015). *Use of microgravity simulators for plant biological studies*. Plant Gravitropism. [Methods Mol Biol. 1309:239-54.](#)

Kamal KY, Herranz R, Hemmersbach R, Medina FJ (2015). *Proper selection of 1g controls in simulated microgravity research as shown for clinorotated plant cell suspension cultures*. [Life sciences and space research](#) 5; 47-52.

Published in 2014

Herranz R, Valbuena MA, **Youssef K**, Medina FJ. (2014). *Mechanisms of disruption of meristematic competence by microgravity in Arabidopsis seedlings*. [Plant Signal Behav. \(2\), 9-10.](#)



CONFERENCE/WORKSHOP ATTENDANCE/TALKS PRESENTED

Conference 2019

Khaled Y. Kamal, G4Green V, Olomouc, Czech Republic 2019
Plant Biotechnology: Green for Good V.

Herranz R, A. Manzano, Kamal KY, van Loon JJWA and F. Medina. XXIII Meeting of the Spanish Society of Plant Physiology and the XVI Hispano-Portuguese Congress of Plant Physiology. 2019, Pamplona, SPAIN
Plant cell growth and cell proliferation balance under novel, Moon and Mars, partial gravity simulation paradigms

Conference 2018

Khaled Y. Kamal Water-Energy-Food-Nexus in MENA Region, Regional Expert Workshop, Aswan, Egypt 2018
Initial assessment of the nutritional quality of the Brassica Species Microgreens as a component of Space Life Support Systems

Conference 2017

Kamal KY. CNES young researchers, Toulouse, France March 2017
Eukaryote cell cycle meets microgravity

Kamal KY. LRSV, CNRS annual meeting, universit  Toulouse III-Paul Sabatier, Toulouse, France March 2017
Future aspects for cell biology research under the gravitational domain. Space life science for Earth life science.

Conference 2016

Kamal KY, van Loon JJWA, Herranz R, Medina FJ. ESA/ISGP/CNES joint life sciences meeting, Toulouse, France 2016
Alterations in cell cycle regulation induced by simulated microgravity in a plant cell culture.

Kamal KY, Herranz R, Medina FJ. Bio-vision (The world life science forum), Alexandria, Egypt 2016
Space biology research, recent notes from space exploration experiments.

Conference 2015

Kamal KY, Herranz R, Medina FJ. National Academy of Science of Ukraine young scientists conference, Kyiv, Ukraine 2015
Microgravity causes changes in Arabidopsis cell developmental processes; cell growth, chromatin organizations, and cell proliferation.

Conference 2014

Medina FJ, Valbuena MA, Kamal KY, Kiss JZ, van Loon JJWA, Herranz R. COSPAR MOSCO 2014
Meristematic competence is disrupted by microgravity, real or simulated, in seedlings and cultures cells of Arabidopsis.

Conference 2013

Kamal KY,, Herranz R, Medina FJ. ELGRA Rome September 2013
Altered gravity induces changes in the plant cell cycle: Growth a synchronic cell culture in a random positioning machine.

Kamal KY,, Herranz R, Medina FJ. ASGSR Orlando November 2013
Disruption of Cell Growth and Proliferation Induced by Simulated Microgravity on Synchronic Plant Cell Cultures.



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