

SU-JEONG KIM, Ph.D.

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AREAS OF RESEARCH

Identification and characterization of microproteins

Functional roles of mitochondrial DNA polymorphism and therapeutic potential of mitochondrial-derived peptides in aging and age-related diseases

PROFESSIONAL APPOINTMENTS

2019 – 2022	Research Assistant Professor Leonard Davis School of Gerontology University of Southern California, Los Angeles, CA
2018 – 2019	Research Associate Leonard Davis School of Gerontology University of Southern California, Los Angeles, CA
2013 – 2018	Postdoctoral Fellow Leonard Davis School of Gerontology University of Southern California, Los Angeles, CA

EDUCATION

2005 – 2012	Ph.D. in Systems Biology Yonsei University, Seoul, South Korea (#2 National University Ranking)
2001 – 2005	Bachelor of Science in Biotechnology Yonsei University, Seoul, South Korea (#2 National University Ranking)

HONORS AND AWARDS

2021	AARP Best Research Scientist Prize, USC, Los Angeles, CA
2018	Dean's Postdoctoral Fellow Award, USC, Los Angeles, CA
2016	24th Annual Summer Training Course in Experimental Aging Research, National Institute of Aging, Oklahoma, OK

- 2012 Graduate with Honor (Summa Cum Laude), Yonsei University, Seoul, South Korea
- 2012 Best Oral Presentation Award, BK21/WCU Research Symposium, Seoul, South Korea
- 2011 Best Poster Presentation Award, KSBNS-MCCS-Asia, Seoul, South Korea
- 2005 – 2007 KBS Science & Technology Scholarship, Seoul, South Korea

FELLOWSHIP AND GRANT SUPPORT

- 2021-2023 Principal Investigator (\$399,228)
Early Investigator Research Award, DoD
Investigate the functional effects of gene variations in mitochondrial small ORFs on Parkinson's disease
- 2021 Principal Investigator (\$10,000)
UW Nathan Shock Center Pilot Grant
Investigate the functional and mechanistic differential effects of SHLP2 and K4R SHLP2 on mitochondrial dysfunction during aging
- 2017 Principal Investigator (\$56,000)
Glenn/AFAR Postdoctoral Fellowship Program for Translational Research on Aging, American Federation for Aging Research (AFAR)
Investigating the senolytic functions of mitochondrial peptides
- 2016 Principal Investigator (\$25,000)
USC Provost's Postdoctoral Scholar Research Grant (USC)
Investigating the role of mitochondrial derived peptides in the regulation of senescence
- 2015 Principal Investigator (\$52,000)
Ellison/AFAR Postdoctoral Fellowship in Aging Research Program
Humanin: a mitochondrial derived peptide that modulates autophagy, neurodegeneration and aging

PUBLICATIONS

1. Miller, B., **Kim, S.J.**, Mehta, H.H., Cao, K., Kumagai, H., Thumaty, N., Leelaprachakul, N., Jiao, H., Vaughan, J., Diedrich, J., Saghatelian, A., Arpawong, T.E., Crimmins, E., Ertekin-Taner, N., Tubi, M.A., Hare, E.T., Braskie, M.N., Décarie-Spain, N., Kanoski, S.E., Grodstein, F., Bennett, D.A., Zhao, L., Toga, A.W., Wan, J., Yen, K., Cohen, P. (2022). Mitochondrial DNA variation in Alzheimer's disease reveals a unique microprotein called SHMOOSE, Sep 21. doi: 10.1038/s41380-022-01769-3.
2. Miller, B., **Kim, S.J.**, Kumagai, H., Yen, K., Cohen, P. (2022). Mitochondria-derived peptides in aging and healthspan. *J. Clin. Invest.*, May 2;132(9):e158449. doi: 10.1172/JCI158449.

3. Kumagai, H., Natsume, T., **Kim, S.J.**, Tobina, T., Mikami, E.M., Shiose, K., Ichinoseki-Sekine, N., Kakigi, R., Tsuzuki, T., Miller, B., Yen, K., Murakami, H., Miyachi, M., Zempo, H., Dobashi, S., Machida, S., Kobayashi, H., Naito, H., Cohen, P., Fuku, N. (2021). The MOTS-c K14Q polymorphism in the mtDNA is associated with muscle fiber composition and muscular performance. *Biochimica et Biophysica Acta (BBA) – General Subjects*, Oct 30;1866(2):130048.
4. **Kim, S.J.**, Devgan, A., Miler, B., Lee, S.M., Kumagai, H., Wilson, K.A., Wassef, G., Wong, R., Mehta, H.H., Cohen, P., Yen, K. (2021). Humanin-induced autophagy plays important roles in skeletal muscle function and lifespan extension. *Biochimica et Biophysica Acta (BBA) – General Subjects*, Oct 6 doi: 10.1016/j.bbagen.2021.130017.
5. Dieli-Conwright, C., Sami, N., Norris, M., Wan, J., Kumagai, H., **Kim, S.J.**, Cohen, P. (2021) Effect of aerobic and resistance exercise on the mitochondrial peptide MOTS-c in Hispanic and Non-Hispanic White breast cancer survivors. *Scientific Reports*. Aug. 19
6. Kumagai, H., Coelho, A.R., Wan, W., Mehta, H., Yen, K., Huang, A., Zempo, H., Fuku, N., Maeda, S., Oliveira, P.J., Cohen, P., **Kim, S.J.*** (2021) MOTS-c reduces myostatin and muscle atrophy signaling. *Am J Physiol Endocrinol Metab*. Feb 8. doi: 10.1152/ajpendo.00275.2020. (*Corresponding author)
7. Miller, B., Silverstein, A., Flores, M., Cao, K., Kumagai, H., Mehta, H., Yen, K., **Kim, S.J.**, Cohen, P. (2021) Host mitochondrial transcriptome response to SARS-CoV-2 in multiple cell models and clinical samples. *Scientific Reports*. Jan 8;11(3).
8. Zempo, H.* , **Kim, S.J. ***, Wan, J., Yen, K., Miller, B., Vicinanza, R., Fuku, N., Nishida, Y., Higaki, Y., Kumagai, H., Naito, H., Xiao, J., Mehta, H., Lee, C., Hara, M., Tanaka, K., Cohen, P. (2021). A pro-diabetogenic mtDNA polymorphism in the mitochondrial-derived peptide, MOTS-c. *Aging (Albany NY)*. Jan 19; 13 (* Equal contribution).
9. **Kim, S.J. ***, Miller, B., Kumagai, H., Silverstein, AR., Flores, M., Yen, K. (2020) Mitochondrial-derived peptides in aging and age-related diseases. *Geroscience*. Sep 10. doi: 10.1007/s11357-020-00262-5. (*Corresponding author)
10. Miller, B., Torres, M., Jiang, X., McKean, R., Noursome, D., **Kim, S.J.**, Mehta, H., Yen, K., Varma, R., Cohen, P. (2020). The mtDNA polymorphism rs41323649 increases cataracts risk in Latinos. *translational vision science & technology*. May 23;9(6):25.
11. Yen, K., Mehta, H., **Kim, S.J.**, Lue, Y., Hoang, J., Guerrero, N., Port, J., Bi, Q., Navarrete, G., Brandhorst, S., Lewis, K.N., Wan, W., Swerdloff, R., Mattison, J.A., Buffenstein, R., Breton, C., Wang, C., Longo, V., Atzmon, G., Wallace, D., Barzilai, N., Cohen, P. (2020). The mitochondrial derived peptide humanin is a regulator of lifespan and healthspan. *Aging (Albany NY)*. Jun 23;12(12):11185-11199.

12. Silverstein, A.R., Flores, M.K., Miller, B., **Kim, S.J.**, Yen, K., Mehta, H.H., Cohen, P. (2020) Mito-Omics and immune function: Applying novel mitochondrial omic techniques to the context of the aging immune system. *Transl Med Aging*. 2020;4:132-140. doi: 10.1016/j.tma.2020.08.001. Epub Aug 21.
13. Merry T.L., Chan, A., Woodhead, J., Kumagai, H., **Kim, S.J.**, Lee, C. (2020). Mitochondrial derived peptides in metabolism, *Am J Physiol Endocrinol Metab*. Oct 1;319(4):E659-E666.
14. Zhao, Y., Zhou, L., Yu, Y., Li, X., Meng, Y., Li, Y., Liu, M., Liu, S., **Kim, S.J.**, Xiao, J., Li, L., Bai, L., Zhang, S., Li, W., Cohen, P., Hoffman, A.R., Hu, J.F., Cui, J. (2020) Nuclear-encoded MALAT1 is aberrantly transported into mitochondria and controls metabolic reprogramming in hepatocellular carcinoma cells. *Molecular Therapy Nucleic Acids*. Oct. 3rd. doi:https://doi.org/10.1016/j.omtn.2020.09.040
15. Miller, B., **Kim, S.J.**, Kumagai, H., Mehta, H.H., Xiang W., Liu, J., Yen, K., Cohen, P. (2020). Peptides derived from small mitochondrial open reading frames: Genomic, biological, and therapeutic implications. *Exp Cell Res*. 112056. doi: 10.1016/j.yexcr.2020.112056.
16. Ko, Y.U.*, **Kim, S.J.***, Lee, J., Song, M.Y., Park, K.S., Park, J.B., Cho, H.S., Oh, Y.J. (2019). PKA-induced phosphorylation at the Thr154 affects stability of DJ-1. *Parkinsonism & Related Disorders* 66, 143-150. (* **Equal contribution**)
17. **Kim, S.J.**, Miller, B., Mehta, H.H., Xiao, J., Wan, J., Arpawong, T.E., Yen, K., Cohen, P. (2019). The Mitochondrial-derived Peptide MOTS-c is a regulator of plasma Metabolites and enhances insulin sensitivity. *Physiological Reports* 7(13), e14171.
18. Mehta, H.H., Xiao, J., Ramirez, R., Miller, B., **Kim, S.J.**, Cohen, P., Yen, K. (2019). Metabolomic profile of diet-induced obesity mice in response to humanin and small humanin-like peptide 2 treatment. *Metabolomics* 15(6), 88.
19. Miller, B., Arpawong, T.E., Jiao, H., **Kim, S.J.**, Yen, K., Mehta, H.H., Wan, J., Carpten, J.C., Cohen, P. (2019). Comparing the Utility of Mitochondrial and Nuclear DNA to Adjust for Genetic Ancestry in Association Studies. *Cells* 8(4), 306.
20. Breton, C.V., Song, S.Y., Xiao, J., **Kim, S.J.**, Mehta, H.H., Wan, J., Yen, K., Morgan, T., Xue, S., Zhang, J., Cohen, P. (2019). Effects of air pollution on mitochondrial function, mitochondrial DNA methylation, and mitochondrial peptide expression. *Mitochondrion* 46, 22–29.
21. **Kim, S.J.**, Chun, M., Wan, J., Lee, C., Yen, K., Cohen, P. (2019). GRSF1 is an age-related regulator of senescence. *Scientific Reports* 9(1), 5546.
22. **Kim, S.J.**, Miller, B., Kumagai, H., Yen, K., Cohen, P. (2019). MOTS-c: an equal opportunity insulin sensitizer. *Journal of Molecular Medicine* 97(4), 487–490.

23. Yen, K., Wan, J., Mehta, H.H., Miller, B., Christensen, A., Levine, M.E., Salomon, M.P., Brandhorst, S., Xiao, J., **Kim, S.J.**, Navarrete, G., Campo, D., Harry, G.J., Longo, V., Pike, C.J., Mack, W.J., Hodis, H.N., Crimmins, E.M., Cohen, P. (2018). Humanin Prevents Age-Related Cognitive Decline in Mice and is Associated with Improved Cognitive Age in Humans. *Scientific Reports* 8(1), 14212.
24. **Kim, S.J.**, Mehta, H., Wan, J., Kuehnemann, C., Chen, J., Hu, J.F., Hoffman, A.R., Cohen, P. (2018). Mitochondrial Peptides Modulate Mitochondrial Function During Cellular Senescence. *Aging (Albany NY)* 10(6), 1239–1256.
25. **Kim, S.J.**, Xiao, J., Cohen, P., Yen, K. (2017). Subcellular fractionation for ERK activation upon mitochondrial-derived peptide treatment. *The Journal of Visualized Experiments* 127.
26. Yu, D., Du, Z., Pian, L., Li, T., Wen, X., Li, W., **Kim, S.J.**, Xiao, J., Cohen, P., Cui, J., Hoffman, A.R., Hu, J.F. (2017). Mitochondrial DNA Hypomethylation Is a Biomarker Associated with Induced Senescence in Human Fetal Heart Mesenchymal Stem Cells. *Stem Cells International* Article ID 1764549–12.
27. **Kim, S.J.**, Xiao, J., Wan, J., Cohen, P., Yen, K. (2017). Mitochondrial derived peptides as novel regulators of metabolism. *The Journal of Physiology* 595(21), 6613–6621.
28. **Kim, S.J.**, Guerrero, N., Wassef, G., Xiao, J., Mehta, H., Cohen, P., Yen, K. (2016). The mitochondrial-derived peptide humanin activates the ERK1/2, AKT, and STAT3 signaling pathways and has age-dependent signaling differences in the hippocampus. *Oncotarget* 7(30), 46899–46912.
29. Xiao, J., **Kim, S.J.**, Cohen, P., Yen, K. (2016). Humanin: Functional Interfaces with IGF-I. *Growth Hormone & IGF Research* 29, 21–27.
30. Lee, C., Zeng, J., Drew, B.G., Martin-Montalvo, A., Wan, J., **Kim, S.J.**, Mehta, H., Hevener, A.L., de Cabo, R., Cohen, P. (2015). A Novel Small Open Reading Frame within the Mitochondrial Genome Encodes a Peptide that Regulates Metabolic Homeostasis and Prevents Obesity. *Cell Metabolism* 21(3), 443–454.
31. **Kim, S.J.**, Park, Y.J., Hwang, I.Y., Youdim, M.B., Park, K.S., Oh, Y.J. (2012). Nuclear translocation of DJ-1 during oxidative stress-induced neuronal cell death. *Free Radical Biology & Medicine* 53, 936–950.
32. **Kim, S.J.**, Park, Y.J., Oh, Y.J. (2012). Proteomic analysis reveals a protective role of DJ-1 during 6-hydroxydopamine-induced cell death. *Biochemical and Biophysical Research Communications* 422, 8–14.

33. Kang, H.*, Han, B.S.*, **Kim, S.J.***, Oh, Y.J. (2012). Mechanisms to prevent caspase activation in rotenone-induced dopaminergic neurodegeneration: Role of ATP depletion and procaspase-9 degradation. *Apoptosis* 17(15), 449–462 (* **Equal contribution**)

Manuscripts in Submission

1. **Kim, S.J.**, Devgan, A., Mehta, H.H., Wan, J., Lee, S.M., Leelaprachakul, N., Schilling, B., Danthi, P.S., Bravo, J.I., Benayoun, B. A., Cohen, P. (*under review*) The RNA-binding protein, hnRNPA1 translocates into the mitochondria, binds to humanin mRNA and modulates humanin expression
2. Miller, B., **Kim, S.J.**, Cao, K., Mehta, H. H., Thumaty, N., Kumagai, H., Iida, T., McGill, C., Pike, C., Zlokovic, B. V., Levine, Z. A., Yen, Y., Sullivan, P.M., Atzmon, G., Barzilai, N., Cohen, P. (*under review*) The humanin variant P3S is an *APOE4* resilience factor
3. **Kim, S.J.**, Miller, B., Hartel, N.B., Ramirez II, R., Liu, C., Levy, D., Arpawong, T.E., Crimmins, E., Jakowec, M.W., Graham, N.A., Cohen, P. (*under review*) A naturally occurring variant of SHLP2 is a protective factor in Parkinson's disease

TEACHING EXPERIENCE

2021	Instructor Gerontology, University of Southern California, LA GERO/BISC440, Biodemography of Aging
2020	Co-instructor Gerontology, University of Southern California, LA GERO593, Research methods
2010, 2008	Teaching Assistant Department of Biology, Yonsei University, Seoul, South Korea General Biology and Laboratory
2010, 2007	Teaching Assistant Department of Biology, Yonsei University, Seoul, South Korea Experiments in biology
2009	Teaching Assistant Department of Biology, Yonsei University, Seoul, South Korea Advanced Biology and Laboratory
2008, 2006	Teaching Assistant College of Engineering, Yonsei University, Seoul, South Korea Biology and Experiments

2007	Teaching Assistant College of Engineering, Yonsei University, Seoul, South Korea Core Biology
2005	Teaching Assistant College of Engineering, Yonsei University, Seoul, South Korea General Biology

MENTORING EXPERIENCE

Rotation Students

2021	Ana Silverstein (Ph.D. student, USC Molecular Biology program)
2020	Genutis, L. (Ph.D. student, USC Molecular Biology program) Flores, M. (Ph.D. student, USC Molecular Biology program)
2018	Ciotlos, S. (Ph.D. candidate, USC-Buck Biology of Aging program)
2017	Miller, B. (Ph.D. candidate, USC Neuroscience program)
2016	Hendricks, E. (Ph.D. candidate, USC Neuroscience program) Kuehnemann, C. (Ph.D. candidate, USC-Buck Biology of Aging program)
2015	Cai, X. (Ph.D. Candidate, USC-Buck Biology of Aging program) Uchoa, M. (Ph.D. candidate, USC Neuroscience program)
2014	Wilson, K. (Postdoc, Buck Institute for Research on Aging)

Undergraduates

2019-2021	Lee, S.M.
2019	Rosen, N., Rivera-Correa, S., Qaiyim, T.
2017-2021	Devgan, A.
2017	Park, S.
2015-2017	Wassef, G.

High school student

2019	Huang, A. (USC Bridge Institute BUGS Jr program)
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INVITED AND/OR PEER-SELECTED ORAL PRESENTATIONS

1. **Kim, S.J.**, Kumagai, H., Cohen, P. (2021) Pro-Diabetogenic mtDNA Polymorphism in the Mitochondrial-Derived Peptide, MOTS-c. 5th World Conference of Exercise Medicine, Virtual Conference
2. **Kim, S.J.**, Devgan, A., Cohen, P. (2019). Mitochondrial-derived peptide, SHLP2 is a protective factor for Parkinson's disease. Finch AD Symposium, Los Angeles, CA
3. **Kim, S.J.**, Mehta, H., Yen, K., Cohen, P. (2019). Mitochondrial-derived peptides and aging. State of the Science Symposium, Bethesda, MD

4. **Kim, S.J.**, Yen, K., Kumagai, H., Mehta, H., Cohen, P. (2019). A Kinesio-Genomic Pro-Diabetogenic mtDNA Polymorphism in the Mitochondrial-Derived Peptide, MOTS-c. Diabetes & Obesity Research Institute Annual Research Symposium, Los Angeles, CA
5. **Kim, S.J.** and Oh, Y.J. (2012). Nuclear translocation of DJ-1 during oxidative stress-induced neuronal cell death. Keystone symposium on Molecular and Cellular Biology, Banff, Alberta, Canada
6. **Kim, S.J.** and Oh, Y.J. (2010). Nuclear translocation of DJ-1/PARK7 during neurotoxin-induced cell death regulates transcription and cell viability. Kyung Hee Brain Conference (KBC), Hong-cheon, South Korea

CONFERENCE PRESENTATIONS (POSTERS)

1. **Kim, S.J.**, Miller, B., Hartel, N., Ramirez II, R., Graham, N.A., Jakowec, M., Cohen, P. (2022). A naturally occurring genetic variant of the mitochondrial-derived peptide SHLP2 is a protective factor for Parkinson's disease. Keystone Symposium on Micropeptides: Biogenesis and Function, Snowbird, UT
2. **Kim, S.J.**, Miller, B., Hartel, N., Graham, N.A., Jakowec, M., Cohen, P. (2021). Mitochondrial-derived peptide, SHLP2, as a potent protective factor in Parkinson's disease. XXVI World Congress on Parkinson's Disease and Related Disorders, Virtual
3. **Kim, S.J.**, Devgan, A., Mehta, H., Cohen, P. (2019). Mitochondrial-derived peptide, SHLP2, a novel protective factor in Parkinson's disease. Gerontological Society of America Annual Scientific Meeting, Austin, TX
4. Miller, B., **Kim, S.J.**, Wan, J., Mehta, H., Yen, K., Cohen, P. (2019). Mitochondrial DNA Variant C2639T is an APOE4 Resilience Factor. Gerontological Society of America Annual Scientific Meeting, Austin, TX
5. **Kim, S.J.**, Zempo, H., Wan, J., Yen, K., Miller, B., Vicinanza, R., Fuku, N., Nishida, Y., Higaki, Y., Kumagai, H., Naito, H., Xiao, J., Mehta, H., Lee, C., Hara, M., Tanaka, K., Cohen, P. (2018). A Kinesio-Genomic Pro-Diabetogenic mtDNA Polymorphism in the Mitochondrial-Derived Peptide, MOTS-c. American Aging Association Annual Meeting, Philadelphia, PA
6. **Kim, S.J.**, Cohen, P. (2018). Mitochondrial RNA binding protein is an age-related regulator of senescence. Cell Symposia - Multifaceted Mitochondria, San Diego, CA
7. **Kim, S.J.**, Zempo, H., Wan, J., Yen, K., Miller, B., Vicinanza, R., Fuku, N., Nishida, Y., Higaki, Y., Kumagai, H., Naito, H., Xiao, J., Mehta, H., Lee, C., Hara, M., Tanaka, K., Cohen, P. (2018), A Kinesio-Genomic Pro-Diabetogenic mtDNA Polymorphism in the Mitochondrial-Derived Peptide, MOTS-c. Keystone Symposium on Drivers of Type 2 Diabetes: From Genes to Environment, Seoul, South Korea

2021	BBA, The FEBS Journal
2020	Int. J. Mol. Sci.
2019	Peptides, Pharmacological Research

MEMBERSHIPS IN PROFESSIONAL ORGANIZATIONS AND SOCIETIES

2015 – Present	Gerontological Society of America
2014 – Present	American Aging Association
2006 – 2012	Society for Neuroscience