Andrew Dillin, Ph.D.

PERSONAL

Name: Andrew Dillin
Citizenship: United States of America
Address: UC Berkeley
Molecular and Cell Biology Department
Li Ka Shing Center, 400A
Berkeley, Ca. 94705

EDUCATION

University of California, Berkeley		
Ph.D.	Molecular and Cell Biology	1993-1998
University of Nevada, Reno		
B.S.	Biochemistry	1989-1993

ACADEMIC APPOINTMENT

2012 - present	Professor, MCB – UC Berkeley
2012 - present	HHMI Investigator, UC Berkeley
2011-2012	Professor, The Salk Institute for Biological Studies, Molecular and Cell Biology Laboratory, La Jolla, California
2009-2012	Adjunct Professor, Department of Neuroscience, University of California, San Diego
2008-2012	Director, Glenn Center for Aging Research at the Salk Institute
2008-2012	HHMI Investigator, The Salk Institute for Biological Studies, Molecular and Cell Biology Laboratory, La Jolla, California
2007-2011	Associate Professor, The Salk Institute for Biological Studies, Molecular and Cell Biology Laboratory, La Jolla, California
2007-2009	Adjunct Associate Professor, Department of Biology, University of California, San Diego
2002- 2007	Assistant Professor, The Salk Institute for Biological Studies, Molecular and Cell Biology Laboratory, La Jolla, California

RESEARCH EXPERIENCE

1998-2002	Postdoctoral Fellow with Dr. Cynthia Kenyon, University of California, San Francisco. Determinants of longevity in the nematode *Caenorhabditis elegans*
1993-1998	Graduate Student with Dr. Jasper Rine, University of California, Berkeley. Studies of transcriptional silencing, regulation of replication initiation and mitosis in yeast
1991-1993	Undergraduate Student with Dr. Ardythe McCracken, University of Nevada. ER associated protein degradation (ERAD)

TEACHING EXPERIENCE

MCB153 – Molecular medicine (2021-present)
MCB153L – Molecular Medicine lab (2025- present)
C175 – Biotech and business capstone (2022-presnt
MCB290 – *Aging (2013), Classic Discoveries in Molecular and Cell Biology (2019)*
Bio1A - 800+ students. *Introductory Biology/Genetics/Cell biology*. (2013-2019)

MCB140L - *Advanced Undergraduate Genetics Lab*. (2013-2022).
MCB140 - *Advanced Undergraduate Genetics*. (2020-2022)

AWARDS

Lurie Prize (2023)
Siebel Distinguished Chair in Stem Cell Biology (2013)
Nathan Shock Award (2012)
NIH/NIA MERIT Award (2012-2022)
Vincent Cristofalo Award (2010)
Glenn Foundation for Medical Research Award (2007-2009)
McKnight Neuroscience of Brain Disorders Award (2007-2010)
Pioneer Developmental Chair (2006-2008)
Ellison Medical Foundation Award (2004-2008)
Larry L. Hillblom Junior Faculty Award (2003-2006)
American Diabetes Association Junior Faculty Award (2004-2006)
Damon Runyon-Walter Winchell Postdoctoral Fellowship, UC San Francisco (1999-2002)
Genentech Distinguished Predoctoral Fellowship, UC Berkeley (1997)
Outstanding Graduate Student Instructor, UC Berkeley (1996-1997)
Outstanding Senior, College of Agriculture, University of Nevada (1992-1993)
Howard Hughes Summer Research Fellowship, University of Nevada (1992)
National Science Foundation Research Fellowship, University of Nevada (1991)

GRANT SUPPORT

-- (Dillin, PI) 09/01/2008-08/31/2032
Howard Hughes Medical Institute
Molecular Pathways of Aging
The major goal of this project is to perform high risk, innovative research towards the understanding of aging and age-related diseases.
Role: PI

R01 AG082797 (Dillin, PI) 08/01/23-04/28/2028
NIH/NIA
The extracellular matrix defines mitochondrial homeostasis and aging.
The major goals of this project are to understand how cellular microenvironment, ie the extracellular matrix, signals to induce mitochondrial stress responses to increase longevity, and how this novel regulatory mechanism impacts on immune responses.
Role: PI

R01 ES021557 (Dillin, PI) 09/01/23-08/31/2026
NIH/NIA
Neuroendocrine Coordination of Mitochondrial Stress Signaling and Proteostasis.
The major goals of this project are to perform research on how mitochondrial stress in one cell type can be communicated to a distal cell type.
Role: PI

R01 AG059566 (Dillin, PI) 07/15/18-03/31/2024
NIH/NIA
Glial regulation of longevity through a transcellular unfolded protein response
The major goal of this project is to explore the mechanism of stress communication between glia and distal tissues and seeks to uncover the identity of signaling agents.

Role: PI

R01 AG05589 (Dillin, PI) 01/01/17-12/31/2023
NIH/NIA
The Collapse of Proteostasis during Aging is Mediated by Cytoskeletal Actin Functions
The major goal of this project is to determine how cytoskeletal integrity is monitored and maintained during the aging process.
Role: PI

Completed

R56 AG073309 (Dillin, PI) 09/20/2021-08/31/2022
NIH/NIA
Extracellular signaling of ER Stress and Immunity. The major goal of this project is to investigate the mechanisms by which cells can sense changes in the extracellular matrix and thus modulate cell and organismal health.
Role: PI

R01 ES021667 (Dillin, PI) 03/01/2012-06/30/2022
NIH/NIEHS
Distal Mitochondrial Signaling in a Multicellular Organism
The major goal of this project is to discover how mitochondria within the nervous system can communicate a signal that will ensure the survival of an animal under conditions of stress.
Role: PI

R37 AG024365 (Dillin, PI) 09/01/2004-08/31/2021
NIH/NIA
The Perception of Mitochondrial Stress in Receiving Cells
The major goal of this project is to determine how distal tissues can sense mitochondrial stress in other tissues, and how their own form and function might change in response to distal mitochondrial signaling.
Role: PI

Peer Reviewed Journal Articles of Andrew Dillin:

Tsui CK, Twells N, Doan E, Brooks J, Kulepa A, Webster B, Mahal LK, **Dillin A**. *Combinatorial CRISPR screens and lectin microarrays identify novel glycosylation regulators.* bioRxiv. 2023 Oct 24

Tharp KM, Park S, Timblin GA, Richards AL, Berg JA, Twells NM, Riley NM, Peltan EL, Shon DJ, Stevenson E, Tsui K, Palomba F, Lefebvre AEYT, Soens RW, Ayad NME, Hoeve-Scott JT, Healy K, Digman M, **Dillin A**, Bertozzi CR, Swaney DL, Mahal LK, Cantor JR, Paszek MJ, Weaver VM. *The microenvironment dictates glycocalyx construction and immune surveillance.* Res Sq. 2023 Aug 16

Bar-Ziv R, Dutta N, Hruby A, Sukarto E, Averbukh M, Alcala A, Henderson HR, Durieux J, Tronnes SU, Ahmad Q, Bolas T, Perez J, Dishart JG, Vega M, Garcia G, Higuchi-Sanabria R, **Dillin A**.

Glial-derived mitochondrial signals impact neuronal proteostasis and aging. Science Advances. October 13 2023

Garcia, G., Zhang, H., Moreno, S., Tsui, C.K., Webster, B.M., Higuchi-Sanabria, R., and **Dillin, A**. *Lipid homeostasis is essential for a maximal ER stress response.* eLife. July 2023

Zhang, H., Li, X., Fan, W., Pandovski, S., Tian, Y. and **Dillin, A**. *Inter-tissue communication of mitochondrial stress and metabolic health.* Life Metabolism. January 7, 2023

Gildea, H.K., Frankino, P.A., Tronnes, S.U., Pender, C.L., Choi, H.O., Hunter, T.D., Cheung, S.S., Frakes, A.E., Sukarto, E., Wickham, K., & **Dillin, A**. *Glia of C. elegans coordinate the heat shock response independent of the neuronal thermosensory circuit and serotonin.* Science Advances 8. December 9, 2022

Murley, A. and **Dillin, A**. *Macroautophagy in quiescent and senescent cells: a pathway to longevity?* Trends in Cell Biol.ogy November 19, 2022

Tan, D., Konduri, S., Ertunc, M.E,.. Zhang, P., Wang, J., Chang, T. Pinto, A.F.M., Rocha, A, Donaldson, C.J., Vaughn, J.M., Ludwig, R.G., Willey, E., Iyer, M., Gray, P.C.,. Maher, P., Allen, N.J., Zuchero, J.B., **Dillin, A**., Mori, M.A., Kohama, S.G., Sigel, D., and Saghatelian, A. *A class of anti-inflammatory lipids decrease with aging in the central nervous system.* Nat Chem Biol. October 20, 2022

Murley A, Wickham K, and **Dillin A**. *Life in lockdown: Orchestrating endoplasmic reticulum and lysosome homeostasis for quiescent cells.* Molecular Cell. August 30, 2022

Frankino, P., Siddiqi, T., Bolas, T., Bar-Ziv, R., Gildea, H., Zhang,, H., Higuchi-Sanabria, R., and **Dillin, A**. *SKN-1 regulates stress resistance downstream of amino catabolism pathways*. iScience 25, 104571, July 15, 2022

Shen K, Pender CL, Bar-Ziv R, Zhang H, Wickham K, Willey E, Durieux J, Ahmad Q, and **Dillin A**. *Mitochondria as Cellular and Organismal Signaling Hubs.* Annu Rev Cell Dev Biol. July 8, 2022

Siddiqi, TF., Frankino, PA., and **Dillin, A**. *Tyrosine catabolites influence SKN-1 signaling in a model of Type I Tyrosinemia.* microPublication Biology. June 2, 2022

Xin, N., Durieux, J., Yang, C., Wolff, S., Kim, HE, and **Dillin, A**. *The UPRmt preserves mitochondrial import to extend lifespan.* Journal of Cell Biology. May 2022

Ward CP, Peng L, Yuen S, Halstead J, Palacios H, Nyangau E, Mohammed H, Ziari N, Dandan M, Frakes AE, Gildea HK, **Dillin A**, & Hellerstein MK *Aging alters the metabolic flux signature of the ER-unfolded protein response in vivo in mice.* Aging Cell. February 16, 2022

Ward, C., Peng, L ., Yuen, S., Chang, M., Karapetyan, R., Nyangau, E., 1, Mohammed, H., Palacios, H., Ziari, N., Joe, L., Frakes, A., Dandan, M., **Dillin, A**., and Hellerstein, M. *ER Unfolded Protein Response in Liver In Vivo Is Characterized by Reduced, Not Increased, De Novo Lipogenesis and Cholesterol Synthesis Rates with Uptake of Fatty Acids from Adipose Tissue: Integrated Gene Expression, Translation Rates and Metabolic Fluxes.* International Journal of Medical Sciences. January 2022

Moehle, E.*, Higuchi-Sanabria, R.*, Tsui, K., Homentcovschi, S., Tharp, K., Zhang, H., Chi, H., Joe, L., de los Rios Rogers, M., Sahay, A., Kelet, N., Benitez, C., Bar-Ziv, R., Garcia, G., Shen, K., Frankino, P., Schinzel, R., Shalem, O., and **Dillin A**. *Cross-species screening platforms identify EPS-8 as a critical link for mitochondrial stress and actin stabilization*, Science Advances. October 2021

Vlassakis J, Hansen LL, Higuchi-Sanabria R, Zhou Y, Tsui CK, **Dillin A**, Huang H, Herr AE. *Measuring expression heterogeneity of single-cell cytoskeletal protein complexes*. Nat Commun. 2021

Tharp KM, Higuchi-Sanabria R, Timblin GA, Ford B, Garzon-Coral C, Schneider C, Muncie JM, Stashko C, Daniele JR, Moore AS, Frankino PA, Homentcovschi S, Manoli SS, Shao H, Richards AL, Chen KH, Hoeve JT, Ku GM, Hellerstein M, Nomura DK, Saijo K, Gestwicki J, Dunn AR, Krogan NJ, Swaney DL, **Dillin A**, Weaver VM. *Adhesion-mediated mechanosignaling forces mitohormesis.* Cell Metab. July 2021

Tsui CK, Dishart JG, **Dillin A**. *Brains and brawn: Stress-induced myokine abates nervous system aging.* Cell Metab. 2021 Jun 2021

Higuchi-Sanabria R, Durieux J, Kelet N, Homentcovschi S, de Los Rios Rogers M, Monshietehadi S, Garcia G, Dallarda S, Daniele JR, Ramachandran V, Sahay A, Tronnes SU, Joe L, and **Dillin A**. *Divergent Nodes of Non-autonomous UPR ER Signaling through Serotonergic and Dopaminergic Neurons*. Cell Rep. 08 Dec 2020

Metcalf, MG, Higuchi-Sanabria, R, Garcia, G, Tsui, K, and **Dillin, A**. *Beyond the cell factory: Homeostatic regulation of and by the UPRER.* Sci Adv. 15 July 2020

Webster BM, Gildea HK, **Dillin A**. *Protein homeostasis from the outside in.* Nat Cell Biol. 08 July 2020

Higuchi-Sanabria R, Shen K, Kelet N, Frankino PA, Durieux J, Bar-Ziv R, Sing CN, Garcia EJ, Homentcovschi S, Sanchez M, Wu R, Tronnes SU, Joe L, Webster B, Ahilon-Jeronimo A, Monshietehadi S, Dallarda S, Pender C, Pon LA, Zoncu R, **Dillin A**.
Lysosomal recycling of amino acids affects ER quality control. Sci Adv. 26 June 2020

Bar-Ziv R, Bolas T, **Dillin A**. *Systemic effects of mitochondrial stress.* EMBO Reports. 24 May 2020

Bar-Ziv, R, Frakes, AF, Higuchi-Sanabria, R, Bolas, T, Frankino, P, Gildea, H, Metcalf, M, and **Dillin, A**. *Measurements of physiological stress responses in C. elegans.* J Vis Exp. 2020 May 21

Frakes, A, Metcalf,M, Tronnes. S. Bar-Ziv, R, Durieux[1], J, Gildea. H, Kandahari, N, Monshietehadi, S, Higuchi-Sanabria, R, **Dillin, A**. *Four glial cells regular ER stress resistance and longevity via neuropeptide signaling.* Science. 2020 January 24.

Daniele J, Higuchi-Sanabria R, Durieux J, Monshietehadi S, Ramachandran V, Tronnes S, Kelet N, Sanchez M, Metcalf M, Garcia G, Frankino P, Benitez C, Zeng M, Esping S, Joe L, & **Dillin A**.
A non-canonical UPRER promotes lipophagy to extend lifespan.
Science Advances. 2020 Jan 1

Schinzel, RT, Higuchi-Sanabria, R, Shalem, O, Moehle, EA, Webster BM, Joe, L, Bar-Ziv, R, Frankino, PA, Durieux, J, Pender, C, Kelet, N, Kumar SS, Savalia, N, Chi, H, Nguyen N, Simic, M, **Dillin A**. The Hyaluronidase, TMEM2, Promotes ER Homeostasis and Longevity Independent of the UPR^{ER} Cell. 2019 Nov 21.

Anderson EC, Frankino PA, Higuchi-Sanabria R, Yang Q, Bian Q, Podshivalova K, Shin A, Kenyon C, **Dillin A**, Meyer BJ. X Chromosome Domain Architecture Regulates Caenorhabditis elegans Lifespan but Not Dosage Compensation.
Dev Cell. 2019 Sep 4.

Frankino PA, Moehle EA, **Dillin A**. Evolutionary Comeuppance: Mitochondrial Stress Awakens the Remnants of Ancient Bacterial Warfare. Cell Metab. 2019 May 7.

Simic M, Moehle E, Schinzel, R, Lorbeer F, Halloran J, Heydari, K , Sanchez M, Jullié D , Hockemeyer D , **Dillin A**. Transient activation of the UPRER is an essential step in the acquisition of pluripotency during reprogramming. Science Advances. 2019 April 20.

Youssar L, Wernet V, Hensel N, Yu X, Hildebrand HG, Schreckenberger B, Kriegler M, Hetzer B, Frankino P, **Dillin A**, Fischer R. Intercellular communication is required for trap formation in the nematode-trapping fungus Duddingtonia flagrans. PLoS Genet. 2019 Mar 27.

Bar-Ziv R, Nguyen NT, **Dillin A**. Vive ut Numquam Moriturus: Tweaking Translational Control to Regulate Longevity. Mol Cell. 2019 Feb 21.

Higuchi-Sanabria R, Paul JW, Durieux J, Benitez C, Frankino PA, Tronnes SU, Garcia G, Daniele JR, Monshietehadi S, **Dillin A**. Spatial regulation of the actin cytoskeleton by HSF-1 dring aging. Mol Biol Cell. 2018 Aug 22.

Zhang, Q, Wu, X, Chen P, Liu, L, Xin, N, Tian Y, **Dillin, A**. The Mitochondrial Unfolded Protein Response Is Mediated Cell-Non-autonomously by Retromer-Dependent Wnt Signaling. Cell. 2018 Aug 9

Daniele JR, Heydari K, **Dillin A**. Mitochondrial Subtype Identification and Characterization. Curr Protoc Cytome. 2018 July.

Simic MS, **Dillin A.** The Lysosome, Elixir of Neural Stem Cell Youth. Cell Stem Cell. 2018 May 3.

Moehle EA, Shen K, **Dillin A**. Mitochondrial Proteostasis in the Context of Cellular and Organismal Heath and Aging. J Biol Chem. 2018 Apr 5.

De Magalhaes Filho CD, Henriquez B, Seah NE, Evans RM, Lapierre LR, **Dillin A**. Visible light reduces C. elegans longevity. Nat Commun. 2018 Mar 2.

Higuchi-Sanabria R, Frankino PA, Paul JW 3rd, Tronnes SU, **Dillin A**. A Futile Battle? Protein Quality Control and the Stress of Aging. Dev Cell. 2018 Jan 22.

Nguyen TB, Louie SM, Daniele JR, Tran Q, **Dillin A,** Zoncu R, Nomura DK, Olzmann JA. DGAT1-Dependent Lipid Droplet Biogenesis Protects Mitochondrial Function during Starvation-Induced Autophagy. *Dev Cell. 2017 Jul 10;42(1):9-21.*

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Berendzen KM, Durieux J, Shao LW, Tian Y, Kim HE, Wolff S, Liu Y, **Dillin A.**

Neuroendocrine Coordination of Mitochondrial Stress Signaling and Proteostasis.
Cell. 2016. 166(6):1553-1563

Kim HE, Grant AR, Simic MS, Kohnz RA, Nomura DK, Durieux J, Riera CE, Sanchez M, Kapernick E, Wolff S, **Dillin A.** Lipid Biosynthesis Coordinates a Mitochondrial-to-Cytosolic Stress Response.
Cell. 2016. 166(6):1539-1552

Daniele JR, Heydari K, Arriaga EA, **Dillin A.** Identification and Characterization of Mitochondrial Subtypes in Caenorhabditis elegans via Analysis of Individual Mitochondria by Flow Cytometry.
Anal Chem. 2016. 88(12):6309-16

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Tian Y, Garcia G, Bian Q, Steffen KK, Joe L, Wolff S, Meyer BJ, **Dillin A.** Mitochondrial Stress Induces Chromatin Reorganization to Promote Longevity and UPR(mt). *Cell. 2016.165(5):1197-208*

Seah NE, de Magalhaes Filho CD, Petrashen AP, Henderson HR, Laguer J, Gonzalez J, **Dillin A,** Hansen M, Lapierre LR. Autophagy-mediated longevity is modulated by lipoprotein biogenesis.
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Heimbucher T, Liu Z, Bossard C, McCloskey R, Carrano AC, Riedel CG, Tanasa B, Klammt C, Fonslow BR, Riera CE, Lillemeier BF, Kemphues K, Yates JR 3rd, O'Shea C, Hunter T, **Dillin A**.
The Deubiquitylase MATH-33 Controls DAF-16 Stability and Function in Metabolism and Longevity.
Cell Metab. 2015. 22(1):151-63.

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Patti GJ, Tautenhahn R, Johannsen D, Kalisiak E, Ravussin E, Brüning JC**, Dillin A**, Siuzdak G. Meta-analysis of global metabolomic data identifies metabolites associated with life-span extension. *Metabolomics. 2014 Aug 1;10(4):737-743.*

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Fonslow BR, Moresco JJ, Tu PG, Aalto AP, Pasquinelli AE, **Dillin AG**, Yates JR 3rd.
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Riera CE, Huising MO, Follett P, Leblanc M, Halloran J, Van Andel R, de Magalhaes Filho CD, Merkwirth C, **Dillin A**. TRPV1 pain receptors regulate longevity and metabolism by neuropeptide signaling. *Cell. 2014. 157(5):1023-36.*

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Taylor RC and **Dillin A**. The UPR^{ER} is a Cell Non-Autonomous Regulator of Stress Resistance and Longevity. *Cell. 2013; 153(7):1435-47.*

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Cohen E, Du D, Joyce D, Kapernick EA, Volovik Y, Kelly JW, Dillin A. Temporal requirements of insulin/IGF-1 signaling for proteotoxicity protection. Aging Cell. 2010;9(2):126-34. PMCID: 3026833.

Mair W, Panowski SH, Shaw RJ, Dillin A. Optimizing dietary restriction for genetic epistasis analysis and gene discovery in C. elegans. PLoS One. 2009;4(2):e4535. PMCID: 2643252.

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