PANKAJ KAPAHI

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EDUCATION

1995-1999	**Ph.D.** - University of Manchester, UK.
1992- 1995	**BSc** - St. Georges Hospital Medical School, University of London. *Magna Cum Laude*. First class honors in Biochemistry with Medical Sciences.
1990	**A levels** - Physics (A), Chemistry (A) and Maths (A).

EMPLOYMENT HISTORY

02/14 – present	Buck Institute for Research on Aging, Novato, CA. *Professor*
06/12 – present	University of California, San Francisco, Dept of Urology *Adjunct Associate Professor.*
02/10 – 02/14	Buck Institute for Research on Aging, Novato, CA. *Associate Professor.*
09/04 – 01/10	Buck Institute for Research on Aging, Novato, CA. *Assistant Professor.*
01/00 – 09/04	Division Biology, California Institute of Technology, Pasadena, CA. *Postdoctoral Research Fellow*. Mentor: Dr. Seymour Benzer.
01/99 – 01/00	Department of Pharmacology, University of California, San Diego, CA. *Postdoctoral Research Fellow*. Mentor: Dr. Michael Karin.
09/95 – 01/99	Department of Gerontology, University of Manchester, Manchester, UK. *Graduate student.* Mentor: Dr. Thomas B. L. Kirkwood.
06/90 – 08/92	Rheumatology Unit, Hammersmith Hospital, London, UK. *Research Associate.* Mentor: Dr. Dorian O. Haskard.

HONORS AND AWARDS

2015	Glenn AFAR award
2011	Julie Martin AFAR Mid-Career Award in Aging Research.
2010	Gerontological Society of America's Nathan Shock New Investigator Award.
2010	EUREKA Award, National Institute of Aging.
2006	'Breakthrough in Gerontology' (BIG) award from the Glenn/AFAR Foundation.
2005	Ellison New Scholar Award.
2001	Project grant from American Federation of Aging Research.
2001	John Douglas Alzheimer Foundation Postdoctoral Fellowship.
1998	Wellcome Prize International Postdoctoral Fellowship.
1998	Wellcome Prize Ph.D. Studentship.
1995	The Pollock Prize (*Magna Cum Laude*).

PROFESSIONAL ORGANIZATIONS

Memberships
2006 – Pres. The Gerontological Society of America
2006 – Pres. Genetics Society of America

Service to Professional Organizations
Chair, Gordon Conference on Biology of Aging, 2013.
Organizing Committee Member, Aging, Metabolism, Stress, Pathogenesis, and Small RNAs in *C. elegans*, UW-Madison, August 2010.
Organizer, Bay Area Worm Meeting, 2009-present.
Organizer, Buck Institute Symposium, 2007, "Nutrient Signaling and Aging," November 2007.
Initiated the formation of the Joint Masters Research Program between Dominican University and Buck Institute.

Service to Scientific Journals
2009- Pres. Section Editor, Aging Cell
2009- 2014. Editor, PLoS one
2010- Pres. Editorial board, Aging
2010- Pres. Editorial board, Healthspan
2011- Pres. Member of 'Faculty of 1000'.

PERSONAL STATEMENT

As a student of Seymour Benzer and Michael Karin, I have been inspired to carry out rigorous and innovative science as well as the value of good mentoring. In particular, the work of Seymour has inspired me to establish invertebrate models that are important to understanding important biological problems and human diseases. Seymour had a remarkable career, which led to landmark discoveries in fields of genetics, circadian clock biology, development, behavior and memory using the fly as a model. Towards the later part of his career in the 1980s, he pioneered the use of invertebrates in modeling human diseases which was initially met with skepticism but over time led to many breakthroughs. The experience in Seymour's laboratory was transformative and enlightening as it helped me realize the power of genetic approaches using invertebrate model systems for understanding biology and modeling human diseases. The power of the invertebrate models is beautifully captured in his biography 'Time, love and memory', which strongly influenced my decision to join his laboratory. This experience has been instrumental in guiding my lab's research at the Buck Institute for Research on Aging, since 2004.

My laboratory has made significant contributions in the areas of nutrient responses, aging, and metabolism. We were one of the first to identify the role of target of rapamycin (TOR) and implicate mRNA translation in mediating lifespan extension by dietary restriction. This work has led to a paradigm shift in the understanding mechanistic underpinnings of dietary restriction (DR). TOR has emerged as one of the most promising targets for lifespan extension and age-related diseases. Inhibition of the TOR pathway has been shown to extend lifespan in yeast, worms, flies and recently even mice. My laboratory studies the effects of nutritional manipulation on metabolism and healthspan using worms and flies. A key contribution of the laboratory has been that modulation of mRNA translation, a critical output of the TOR pathway, plays a significant role in determining lifespan in worms and flies. We demonstrated that inhibition of cap-dependent protein translation via eIF4E binding protein (4EBP) downstream of the TOR pathway played a critical role in regulating lifespan extension by DR in *D.*

melanogaster. More recently, we demonstrated that inhibition of eIF4G extends lifespan by preferentially enhancing translation of genes associated with stress responses. We also identified a critical role for enhanced fat turnover upon DR in mediating the lifespan extension upon DR. My laboratory employs an interdisciplinary approach, combining biochemical, genetic and genomic techniques, to understand how nutrients modulate changes in lifespan and metabolism using *D. melanogaster*, *C. elegans* and recently mammalian cell culture. More recently, we have also identified a critical role for circadian clocks in mediating the lifespan extension and changes in fat metabolism upon dietary restriction.

CONTRIBUTIONS TO SCIENCE

(over 65 peer reviewed articles, h index- 34 and i-10 index- 52)

1. Investigating mechanisms of lifespan extension by dietary restriction. One of the major goals of my lab has been to understand the mechanisms that determine lifespan extension by dietary restriction, a robust mechanism of lifespan extension across species. Following our discovery of the role of TOR in mediating the effects of dietary restriction, we have focused on downstream effectors that modulate nutrient-dependent responses to dietary restriction. We have recently uncovered a significant role of peripheral circadian clocks in this process. Understanding the link between metabolism and aging is one of the holy grails in the field. We demonstrated for the first time that lifespan extension by dietary restriction enhances fatty acid synthesis and degradation. We also demonstrated that enhanced fatty acid metabolism in the muscle and increased physical activity are required for lifespan extension by dietary restriction (Katewa et al. 2012). In recent work using metabolomics, we have also demonstrated that DR reverses the age-related changes in the metabolome (Laye et al. 2015). In a prior study, we have identified a role for 4E-BP and differential mRNA translation as a mediator of metabolism and lifespan extension upon dietary restriction. We identified a novel role for 4E-BP in enhancing mitochondrial mRNA translation upon DR through their 5'UTR element, demonstrating a novel mode of increasing mitochondrial function by enhancing translation of nuclear-encoded mitochondrial genes.

1. Peripheral clocks modulate lifespan and fat metabolism upon dietary restriction. Katewa SD, Akagi K, Bose N, Rakshit K, Camarella T, Zheng X, Hall D, Davis S, Nelson CS, Brem RB, Ramanathan A, Sehgal A, Giebultowicz JM, **Kapahi P**. *Cell Metab* 2016 Jan 12;23(1):143-54 PMID: 26626459. PMCID: PMC4715572
2. Laye M, Tran, VL, Jones D, **Kapahi P***, Promislow D*. The effects of age and dietary restriction on the tissue-specific metabolome of *Drosophila***.** (2015) *Aging Cell* 14(5):797-808. PMC4568967 *Joint senior authors
3. Katewa D, Demontis F, Kolipinski M, Hubbard A, Gill M, Perrimon N, Melov S, **Kapahi P** (2012) Intra-myocellular triglyceride turnover plays a critical role in mediating responses to dietary restriction in *Drosophila melanogaster. Cell Metab* 16:97-103. PMC3400463
4. Zid BM, Rogers AN, Katewa SD, Vargas MA, Kolipinski MC, Lu TA, **Kapahi P**. (2009) 4E-BP extends lifespan upon dietary restriction by enhancing mitochondrial activity in Drosophila. *Cell* 139:149-60. PMC2759400.

2. Identification of TOR as a key mediator of lifespan extension in flies and worms. During my work as a postdoctoral fellow, I was one of the first to identify the role of target of rapamycin (TOR) in mediating lifespan extension by dietary restriction. This work has led to a paradigm shift in the understanding mechanistic underpinnings of dietary restriction (DR). TOR has emerged as one of the most promising targets for lifespan extension and age-related diseases. Inhibition of the TOR pathway has been shown to extend lifespan in yeast, worms, flies and even mice. We have also undertaken more in-depth

investigating the role of S6 Kinase in modulating lifespan, leading to the identification of a novel role for HIF-1 and IRE-1 as part of a nutrient-responsive pathway which acts downstream of the S6 kinase to mediate the effects of dietary restriction in *C. elegans*. Furthermore, in a recent study we observed an almost five-fold extension in lifespan by combining long-lived insulin-like receptor, *daf-2*, with S6 kinase mutants, opening the possibility of synergistic lifespan extension by combining treatments that inhibit insulin-like signaling and TOR pathways in other species.

1. Chen D, Li P. W., Goldstein, B. A., Cai, W., Thomas, E. L., Chen, F., Hubbard, A. E., Melov, S., **Kapahi, P**. (2013) Germline Signaling Mediates the Synergistically Prolonged Longevity Produced by Double Mutations in daf-2 and rsks-1 in C. elegans. *Cell Rep*, 5:1600-10. PMC3904953
2. **Kapahi P,** Chen D, Rogers AN, Katewa SD, Li PW, Thomas EL, Kockel L. (2010) With TOR, less is more: a key role for the conserved nutrient-sensing TOR pathway in aging. *Cell Metab* 11:453-65. PMC2885591.
3. Chen D, Thomas EL, **Kapahi P**. (2009) HIF-1 modulates dietary restriction-mediated lifespan extension via IRE-1 in *Caenorhabditis elegans*. *PLoS Genet* **5**:e1000486. PMC2676694.
4. **Kapahi P**, Zid BM, Harper T, Koslover D, Sapin V, Benzer S. (2004) Regulation of lifespan in Drosophila by modulation of genes in the TOR signaling pathway. *Curr Biol* **14**:885-90. PMC2754830.

3. Identification of a critical role for inhibition of mRNA translation in slowing aging by mediating antagonistic pleiotropy using *C. elegans*. The first study on this list identified for the first time that inhibition of mRNA translation extends lifespan. In the second study, we used a novel genetic screen to identify genes involved in mRNA translation and protein synthesis play a fundamental role in growth and development, but if inhibited later in life, they extend lifespan. The last two studies identify the mechanism by which inhibiting mRNA translation extends lifespan. We demonstrated that inhibition of global mRNA translation or inhibition of insulin signaling pathway paradoxically enhances mRNA translation of stress response gene expression that mediates this observed lifespan extension.

1. Pan KZ, Palter JE, Rogers AN, Olsen A, Chen D, Lithgow GJ, **Kapahi P**. (2007) Inhibition of mRNA translation extends lifespan in *Caenorhabditis elegans*. *Aging Cell.* 6(1):111-9. PMC2745345.
2. Chen D, Pan KZ, Palter JE, **Kapahi P**. (2007) Longevity determined by developmental arrest genes in *Caenorhabditis elegans*. *Aging Cell.* 6(4):525-33. PMC2746107.
3. Rogers AN, Chen D, McColl G, Czerwieniec G, Felkey K, Gibson BW, Hubbard A, Melov S, Lithgow GJ, **Kapahi P**. (2011) Life span extension via eIF4G inhibition is mediated by posttranscriptional remodeling of stress response gene expression in *C. elegans*. *Cell Metab.* 2011 Jul 6;14(1): 55-66. PMC3220185
4. McColl G, Rogers AN, Alavez S, Hubbard AE, Melov S, Link CD, Bush AI, **Kapahi P***, Lithgow GJ* (2010) Insulin-like signaling determines survival during stress via posttranscriptional mechanisms in *C. elegans*. *Cell Metab.* (** joint last authors)* 12(3)**:** 260-272 PMC2945254

4. Modeling disease and behavioral processes. The following studies are examples where we are modelling human diseases or biological processes in invertebrates or mice and examining their pathogenesis.

1. Tiffany Zee. Neelanjan Bose, Marshall Stoller, **Pankaj Kapahi.** Alpha lipoic acid ameliorates stone formation in a mouse model of cystinuria. (*accepted at Nature Medicine*)
   In this study we demonstrate that lipoic acid can significantly ameliorate cystine formation in a mouse model. We demonstrate a novel mechanism of stone prevention by enhancing solubility of cystine using bot *in vitro* and *in vivo* assays.

2. Chaudhuri J, Bose N, Gong J, Hall D, Rifkind A, Bhaumik D, Peiris TH, Chamoli M, Le CH, Liu J, Lithgow GJ, Ramanathan A, Xu XZ, **Kapahi P**. A Caenorhabditis elegans Model Elucidates a Conserved Role for TRPA1-Nrf Signaling in Reactive α-Dicarbonyl Detoxification.(2016) *Curr Biol.* (16)31073-9. PMID:27773573
   In this study we demonstrate that *C. elegans* can be used to study the effects of AGE accumulations and that it leads to pathologies reminiscent of diabetic complications. We also identify TRPA1 as a sensor for MGO that activates SKN-1. A drug screen identified podocarpic acid that can activate TRPA1 and ameliorate the consequences of AGE accumulation.

3. Chi T, Kim MS, Kahn A, Flechner L, Blaschko S, Lang S, Zee T, Muteliefu G, Bond N, Kolipinski M, Fakra SC, Miller J, Killilea DW, Brückner K, **Kapahi P***, and Stoller ML*. (2015) A *Drosophila* Model Identifies a Critical Role for Zinc Physiology in Initiating Kidney Stone Disease. (2015) *PLOS One*, 10(5):e0124150 PMID: 25970330 * Joint senior authors

   In this study in collaboration with Dr. Stoller, a stone surgeon, we established a model for kidney stone disease using *D. melanogaster*. We observed that knockdown of xanthine dehydrogenase just like in humans can cause hypoxanthine accumulation and stone formation in a diet dependent manner.

4. Vargas M, Yamaguchi A, Luo N, **Kapahi P**. (2010) A role for S6 Kinase mediates post mating dietary switch and nutrient preferences in *D. melanogaster. Curr Biol.* 20(11):1006-11. PMID: 20471266 PMCID: PMC2885474.

   This study demonstrated that flies exhibit nutrient preference to sugar or protein depending on their prior physiological state. Flies deprived of protein or after mating display a strong preference towards a protein-rich diet, which is regulated by expression of S6 Kinase in the brain.

5. Inflammation and disease. Following our observation on TOR, we have been collaborating with the Campisi lab to examine its role in cellular senescence. In a recent study, we demonstrate for the first time that inhibition of TOR inhibits the senescence-associated secretory phenotype. We have also shown that commonly used drugs like simvastatin also inhibit the SASP. These two studies have wide relevance in explaining the protective effects of inhibiting TOR and statins on many age-related diseases. In previous studies, I defined the mechanism of NF-Kappa B inhibition and inflammation reduction by modulating Ikappa B Kinase. I identified the mechanism by which Ikappa B Kinase is inhibited via a critical cysteine residue by various inhibitors of NF-Kappa B, leading to a better understanding of how prostaglandins, arsenite, and hypoestoxide inhibit NF-Kappa B. As a research assistant I was involved in the discovery soluble forms of various adhesion molecules including ICAM-1, VCAM-1 and ELAM-1 devised sandwich ELISAs. Using these assays, which are now commercially avaiable, we observed an increase in levels of circulating adhesion molecules in many diseases like rheumatoid arthritis.

1. Simvastatin suppresses breast cancer cell proliferation induced by senescent cells. Liu S, Uppal H, Demaria M, Desprez PY, Campisi J, **Kapahi P.** 2015 *Scientific Reports* 14;5:17895 PMC4677323
2. mTOR Regulates the Tumor-Promoting Senescence-Associated Secretory Phenotype. Laberge RM, Sun Y, Orjalo AV, Patil CK, Freund A, Zhou L, Curran SC, Davalos AR, Wilson-Edell KA, Liu S, Limbad C, Demaria M, Li P, Hubbard GB, Ikeno Y, Javors M, Desprez PY, Benz CC, **Kapahi P**, Nelson PS, Campisi J. (2015) *Nature Cell Biol* 17:1049-1061. PMC4691706
3. Rossi A*, **Kapahi P***, Natoli G, Takahashi T, Chen Y, Karin M. (2000) Anti-inflammatory cyclopentenone prostaglandins are direct inhibitors of IkappaB kinase. (**joint first authors*) *Nature*. 403(6765):103-8. (**joint first authors*)
4. **Kapahi P**, Takahashi T, Natoli G, Adams SR, Chen Y, Tsien RY. (2000) Inhibition of NF-kappa B activation by arsenite through reaction with a critical cysteine in the activation loop of Ikappa B kinase. *J Biol Chem*. 275(46):36062-6

PUBLICATIONS

1. Alpha lipoic acid ameliorates stone formation in a mouse model of cystinuria. Tiffany Zee. Neelanjan Bose, Marshall Stoller, Pankaj Kapahi (*accepted at Nature Medicine*)
2. Cross-phenotype association tests uncover genes mediating nutrient response in Drosophila (2016) Nelson CS, Beck JN, Wilson KA, Pilcher ER, **Kapahi P***, Brem RB.* (*contributed equally) *BMC Genomics*. 4;17(1):867. PMID:27809764 PMCID:PMC5095962
3. Intestinal IRE1 Is Required for Increased Triglyceride Metabolism and Longer Lifespan under Dietary Restriction.(2016) Luis NM, Wang L, Ortega M, Deng H, Katewa SD, Li PW, Karpac J, Jasper H, **Kapahi P**. *Cell Rep*. 25;17(5):1207-1216. PMID:27783936 PMCID:PMC5089850
4. A genome-wide screen of bacterial mutants to assess the influence on dauer formation in *C. elegans.* Amit Khanna1,#, Jitendra Kumar#, Miguel Vargas1,#, Tom McCloskey, LaKisha Barrett,Subhash Katewa1, Patrick Li1, Amit Sharma1, Nicole Naudé1, Christopher Nelson1, Rachel Brem1, David.W. Killilea2, Sean Mooney3, Matthew Gill4 and **Pankaj Kapahi*** (*accepted, Sci Reports*)
5. A Caenorhabditis elegans Model Elucidates a Conserved Role for TRPA1-Nrf Signaling in Reactive α-Dicarbonyl Detoxification.(2016) Chaudhuri J, Bose N, Gong J, Hall D, Rifkind A, Bhaumik D, Peiris TH, Chamoli M, Le CH, Liu J, Lithgow GJ, Ramanathan A, Xu XZ, **Kapahi P**. *Curr Biol.* (16)31073-9. PMID:27773573
6. Zinc Levels Modulate Lifespan through Multiple Longevity Pathways in Caenorhabditis elegans.Kumar J, Barhydt T, Awasthi A, Lithgow GJ, Killilea DW, **Kapahi P**. PLoS One. 2016 Apr 14;11(4):e0153513.PMID:27078872
7. Peripheral clocks modulate lifespan and fat metabolism upon dietary restriction. Katewa SD, Akagi K, Bose N, Rakshit K, Camarella T, Zheng X, Hall D, Davis S, Nelson CS, Brem RB, Ramanathan A, Sehgal A, Giebultowicz JM, **Kapahi P**. *Cell Metab* 2016 Jan 12;23(1):143-54 PMID: 26626459. PMCID: PMC4715572
8. Alzheimer's Model Develops Early ADHD Syndrome. Zhang Q, Du G, John V, **Kapahi P**, Bredesen DE. J Neurol Neurophysiol. 2015;6(6):1-6.
9. Simvastatin suppresses breast cancer cell proliferation induced by senescent cells. Liu S, Uppal H, Demaria M, Desprez PY, Campisi J, **Kapahi P.** 2015 *Scientific Reports* 14;5:17895 PMC4677323
10. mTOR Regulates the Tumor-Promoting Senescence-Associated Secretory Phenotype. Laberge RM, Sun Y, Orjalo AV, Patil CK, Freund A, Zhou L, Curran SC, Davalos AR, Wilson-Edell KA, Liu S, Limbad C, Demaria M, Li P, Hubbard GB, Ikeno Y, Javors M, Desprez PY, Benz CC, **Kapahi P**, Nelson PS, Campisi J. (2015) *Nature Cell Biol* 17:1049-1061. PMC4691706
11. Laye M, Tran, VL, Jones D, **Kapahi P***, Promislow D*. The effects of age and dietary restriction on the tissue-specific metabolome of *Drosophila***.** (2015) *Aging Cell* 14(5):797-808. PMC4568967 *Joint senior authors
12. Chi T, Kim MS, Kahn A, Flechner L, Blaschko S, Lang S, Zee T, Muteliefu G, Bond N, Kolipinski M, Fakra SC, Miller J, Killilea DW, Brückner K, **Kapahi P***, and Stoller ML*. (2015) A *Drosophila* Model Identifies a Critical Role for Zinc Physiology in Initiating Kidney Stone Disease. (2015) *PLOS One*, 10(5):e0124150 PMID: 25970330 * Joint senior authors
13. Killilea DW, Westropp JL, Shiraki R, Mellema M, Larsen J, Kahn AJ, **Kapahi P**, Chi T, and Stoller ML. Elemental Content of Calcium Oxalate Stones from a Canine Model of Urinary Stone Disease. *PLOS One*, 2015 Jun 11;10(6):e0128374 PMID: 26066810

14. Klang IM, Schilling B, Sorensen DJ, Sahu AK, **Kapahi P**, Andersen JK, Swoboda P, Killilea DW, Gibson BW, Lithgow GJ. (2014) Iron promotes protein insolubility and aging in C. elegans. *Aging* (Albany NY).6(11):975-91.

15. D Chatterjee, SD Katewa, Y Qi, SA Jackson, **P Kapahi**, H Jasper. (2014) Control of metabolic adaptation to fasting by dILP6-induced insulin signaling in Drosophila oenocytes. *PNAS*, 16;111(50):17959-64.

16. Lin YH., Chen YC, Kao TY, Lin YC, Hsu TE, Wu YC, Ja WW, Brummel TJ, **Kapahi** P, Yuh CH, Yu LK, Lin ZH, You RJ, Jhong YT, Wang HD. (2014) Diacylglycerol lipase regulates lifespan and oxidative stress response by inversely modulating TOR signaling in Drosophila and C. elegans. *Aging Cell*. 2014 13(4):755-64

17. Kaul, T. K., Reis Rodrigues, P., Ogungbe, I. V., **Kapahi, P**., Gill, M. S. (2014) Bacterial fatty acids enhance recovery from the dauer larva in Caenorhabditis elegans *PLoS One* 9:1 e86979

18. Chen D, Li P. W., Goldstein, B. A., Cai, W., Thomas, E. L., Chen, F., Hubbard, A. E., Melov, S., **Kapahi, P**. (2013) Germline Signaling Mediates the Synergistically Prolonged Longevity Produced by Double Mutations in daf-2 and rsks-1 in C. elegans. *Cell Rep*, 5:1600-10. PMC3904953

19. Shin J, He M, Liu Y, Paredes S, Villanova L, Brown K, Qiu X, Nabavi N, Mohrin M, Wojnoonski K, Li P, Cheng HL, Murphy AJ, Valenzuela DM, Luo H, **Kapahi P**, Krauss R, Mostoslavsky R, Yancopoulos GD, Alt FW, Chua KF, Chen D. (2013) RT7 represses Myc activity to suppress ER stress and prevent fatty liver disease. *Cell Rep*. 5(3):654-65.

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21. Bruce KD, Hoxha S, Carvalho GB, Yamada R, Wang HD, Karayan P, He S, Brummel T, **Kapahi P***, Ja WW*. (2013) High carbohydrate-low protein consumption maximizes Drosophila lifespan. *Exp Gerontol* 48:1129-35. PMC3687007 * Joint senior authors

22. Blaschko SD, Chi T, Miller J, Flechner L, Fakra S, **Kapahi P**, Kahn A, Stoller ML. (2013) Strontium substitution for calcium in lithogenesis. *J Urol* 189:735-9 PMID: 23260568

23. Blaschko SD, Chi T, Miller J, Flechner L, Fakra S, **Kapahi P**, Kahn A, Stoller ML (2013) Microcomposition of human urinary calculi using advanced imaging techniques. *J Urol* 189:726-34 PMID:23021997

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35. Yun J, Cao JH, Dodson MW, Clark IE, **Kapahi P**, Chowdhury RB. (2008) Loss-of-function analysis suggests that Omi/HtrA2 is not an essential component of the PINK1/PARKIN pathway in vivo. *J Neurosci.* 28(53):14500-10. PMID: 19118185 PMCID: PMC2718055.

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REVIEWS AND CHAPTERS

53. Ramaswamy K, Killilea DW, **Kapahi P**, Kahn AJ, Chi T, Stoller ML. (2015) The elementome of calcium-based urinary stones and its role in urolithiasis. *Nat Rev Urol.* PMID:26334088

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INVITED LECTURES

1. University of Texas, Oct 2017
2. Hillblom Foundation Meeting, Jan 2017
3. University of Virginia, Oct 2016
4. Sanford-Burnham Institute, San Diego, August 2016
5. Mount Desert Island Biological Laboratories, Aging Course lecture, June 2016

6. American Aging Association Meeting, Seattle, June 2016
7. Joslin Diabetes Center, May 2016
8. University of Pennsylvania, Philadelphia, March 2016
9. National Institute of Immunology, New Delhi November 2015
10. The University of California, Davis, October 2015
11. The University of Michigan, Ann Arbor, September 2015
12. Calico, San Francisco, July 2015
13. NIA Aging course, Buck Institute June 2015
14. American Aging Association meeting, Marina Del Rey, May 2015
15. Yale University, Endocrine Grand Rounds. April 2015
16. The University of Texas, San Antonio, Microbiome and aging conference. October 2014
17. University of California, San Francisco, Department of Hematology. July 2013
18. Children's Hospital Oakland Research Institute. August 2013
19. Sanford-Burnham Institute. April 2013
20. NIH Bethesda, Workshop on Circadian clocks. February 2013
21. Caloric Restriction Society, San Francisco. June 2012
22. Scripps Institute, Florida. December 2012
23. CSHL, Genetics of Aging meeting. October 2012
24. Stanford University, 'Frontiers in aging seminar series'. September 2012
25. University of California, San Francisco, CVRI. April 2012
26. University of Southern California, Andrus Gerontology Center. October 2011
27. The University of California, San Francisco, Department of Urology. July 2011
28. University of California, San Francisco, Endocrine Grand Rounds. May 2011
29. University of California, San Francisco, Department of Endocrinology. December 2010
30. University of Basel, Switzerland. December 2010
31. The University of Rochester, Department of Aging. December 2010
32. Cornell University, Department of Nutrition. December 2010
33. Gerontological Society of America, New Orleans, LA. November 2010
34. Nathan Shock Aging Center 2010 Conference on Aging, San Antonio, TX. October 2010.
35. National Institute of Aging workshop, Circadian Clocks and Their Role in Aging: Molecular Mechanisms, Bethesda, MD. June 2010.
36. University of Michigan, Ann Arbor, MI, Nathan Shock: Aging and TOR Signaling Conference. May 2010.
37. Keystone Symposium on aging, Tahoe, CA. March 2010.
38. University of California, Berkeley, Nutrition department. October 2009.
39. University of California, San Francisco, Neurosciences department. October 2009.
40. Buck Institute symposium on systems biology of aging. Buck Institute for Age Research. November 2009.
41. Ellison Foundation Colloquium on the Biology of Aging, Ellison Medical Foundation. 2009; Colloquium, Woods Hole, MA. August 2009.
42. NIA Summer Training Course in Experimental Aging Research. Buck Institute for Research on Aging. June 14-18 2009.
43. American Geriatric Society Symposium, American Aging Association 38th Annual Conference, Scottsdale, AZ. May 2009.
44. IPSEN Foundation conference, Salk Institute. January 2009.
45. The National Institute on Aging IRP Distinguished Lecturer in Neuroscience and Aging (Series). Baltimore, MD. December 16, 2008.
46. Sonoma State University Lifelong Education Class "21st Century Genetics," Buck Institute for Research on Aging. November 20, 2008.
47. Keystone Symposia on Molecular and Cellular Biology, Pathways of Longevity, Copper Mountain Resort, Copper Mountain, CO. March 3 – April 4, 2008.

48. Brain Diseases and Molecular Machines: Spotlights from Evolution, Development and Network Biology, Paris, France. March 25–28, 2008
49. Cold Spring Harbor Meeting on Genetics of Aging, Cold Spring Harbor. 2008.
50. The Gerontological Society of America, 60th Annual Scientific Meeting, The Era of Global Aging: Challenges and Opportunities. November 2007.
51. Nathan Shock Center Conference on Aging, Nutrients and Aging. San Antonio, TX. October, 2006.
52. NIA Summer Training Course in Experimental Aging Research. June 2006.
53. The University of Washington, Seattle, The Basic Biology of Aging Series. June 6, 2006.
54. 47th Drosophila Meeting, 2005.
55. 44th Drosophila Meeting, 2003.
56. Cold Spring Harbor Meeting on Genetics of Aging, Cold Spring Harbor. 2002.
57. 43rd Drosophila Meeting, 2002.
58. Gordon Research Conference on Free Radicals in Disease. Ventura, CA. February 2001.
59. Gordon Conference on Biology of Aging, Ventura, CA. February 2000. (awarded the poster prize)
60. Cold Spring Harbor Meeting on Genetics of Aging, Cold Spring Harbor. April 1998
61. Gordon Conference on Biology of Aging, Italy. May, 1998.
62. 4th Biomed Conference on Molecular Gerontology, Paris. November, 1997.

PATENTS

1.Podocarpic acid and derivatives thereof for treatment of diabetic complications (2016) (pending)
J. Chaudhuri, N Bose, P Kapahi
2.Lipoic acid and derivatives thereof for treatment of Cystinuria (2016)
T Zee, M Stoller, P Kapahi
3.Zinc modulation to prevent kidney stone formation (2013)
Tom Chi, P Kapahi, M Stoller
4.Methods for identifying and using IKK inhibitors (2003)
M Karin, P Kapahi

ACTIVE GRANTS

R01AG045835 (PI: Kapahi) 7/1/2013 - 6/30/2018
National Institutes of Health
Role of Circadian Clocks in Aging using Drosophila

R01 AG038688 (PI: Kapahi) 9/30/2011 - 8/31/2016
National Institute on Aging
Molecular Mechanisms of Lifespan Extension by Dietary Restriction in *Drosophila*

R21 AG053066 (Kapahi) 9/30/16- 9/30/18
The role of advanced glycation end products in modulating healthspan using C. elegans.
This project will evaluate the role of GLOD-4 in modulating lifespan in diabetic neuropathy using *C. elegans*. In addition, we propose to identify novel glyoxalases from a candidate gene screen phenotypically and measurement of alpha-dicarbonyls.

R21 (Kapahi) 9/30/17- 9/30/19
The role of natural variation in mediating the effects of dietary restriction on aging.
This project will evaluate the role of naturally occurring genetic variation in strains of flies in mediating the effects of DR. Furthermore, we will characterize the function of identified genes in mediating lifespan and healthspan effects.

EXPIRED GRANTS (LAST 3 YEARS)

R01 AG038012 (PI: Kapahi) 8/1/2010 - 7/31/2014
National Institute on Aging
(EUREKA) Role of mRNA translation in the effects of dietary restriction on lifespan
Investigate the mechanism by which tissue-specific changes in mRNA translation mediates the lifespan extension effects by dietary restriction using *Drosophila*.

AFAR Mid-Career Award (PI: Kapahi) 7/1/2011 - 6/30/2016
American Federation for Aging Research
The role of muscle-dependent changes in lipid metabolism upon dietary restriction in *Drosophila melanogaster*.

P01 AG041122 Subcontract Mayo 5/1/2012 - 4/30/2017
(PI: Kirkland, Campisi Co-PI: Kapahi)
National Institute on Aging
Cellular Senescence and Aging

R21 DK091727-01A1 (PI: Kapahi) 6/1/2012 - 5/31/2015
National Institutes of Health
A model of kidney stone disease using *D. melanogaster*

TRAINEES

Training Period	Trainee Name	Current Position of Past Trainees
2000-2005	Brian Zid	Assistant Professor, UCSD (Ph.D. student)
2004 –2006	Kally Pan	Ph.D., Columbia University (Research Assistant)
2005-2012	Di Chen	Assistant Professor, Nanjing University (Postdoc)
2005-06	Atsushi Yamaguchi	Assistant Professor, Chiba U, Japan (Postdoc)
2005-2011	Aric Rogers	Assistant Professor, MDI Biological Laboratory (Postdoc)
2006-2006	Julia Palter	Ph.D., UCSB (Research Assistant)
2007-2009	Ursula Edman.	Scientist, Biotech Industry (Postdoc)
2007-2009	Ninguang Luo	MD (Postdoc)
2008-present	Patrick Li.	Scientist, Sangamo Biosciences (Postdoc)
2008-2010	Tom McCloskey	Scientist, U California-Berkeley (Postdoc)
2008-2012	Miguel Vargas.	Scientist, Biotech industry (Ph.D. student)
2009-present	Subhash Katewa	Research Assistant Professor, Buck Institute (Postdoc)
2009-2011	Tom Chi	Assistant Professor, UCSF (Postdoc)
2009-2013	Man Su Kim	Assistant Professor, College of Pharmacy, Inje University, Gimhae, Republic of Korea (Postdoc)
2009 -2014	Timothy Camarella	Scientist, Biotech industry (Masters student)
2010-present	Su Liu.	Scientist Biomarin (post-doc)

Training Period	Trainee Name	Current Position of Past Trainees
2011 -2013	Nicole Naude.	Clinical Laboratory Scientologist, Univ. Penn. (Masters student)
2011-2015	Matt Laye	Assistant Professor, College of Idaho (Postdoc)
2011-12	Marysia Kolipinski	Nurse Practitioner (Masters student)
2011 - 2013	Jennika Krisa.	Sales Manager, Sepax Technologies (Masters student)
2011-2016	Kazutaka Akagi,	Assistant Professor, National center for geriatrics and gerontology, Japan (Postdoc)
2011-present	Nichole Bond	High school Teacher (Postdoc)
2011-present	Guiping Du	Scientist, biotech (Postdoc)
2011-present	Jitendra Kumar	Assistant Professor, (DBT-IPLS program) Patna University (Postdoc)
2012-2014	Sharon Epstein	Patent office lawyer, Buck Institute (Postdoc)
2012-2014	Hai Lu	Scientist, Biotech Industry (Masters student)
2012-2016	Sven Lang	Assistant Professor, Saarland University Faculty of Medicine Germany (postdoc)
2012-present	Nuno Luis	Postdoc, Germany,(postdoc)
2012-present	Amit Khanna	Scientist, Affymetrix, (postdoc)
2012- 2015	Catherine Le	Scientist, Roche, (postdoc)
2012-2015	Gulnur Muteliefu	Scientist, Ultragenyx (Postdoc)
2013-2014	Sruthi Damodar	Scientist, Biotech Industry (Masters student)
2014-2016	Mauricio Ortega	Pharmacy student (Masters student)
2014-2016	Alex Rifkind	Medical student (Masters student)
2014- present	Mark Watson	Postdoc, Brand Lab (postdoc)
2015-present	Jesse Simons	Research associate, Ellerby lab (Masters student)
2015-present	Sana Khateeb	Research associate, Benz lab (Masters student)
2015-present	See Yang	Research associate, Dominican University (Masters student)
2015-present	Tanuja H. Peiris	Current Postdoc
2016- present	Sanjib Ghua	Current Postdoc
2014-present	Jyotiska Chaudhari	Current Postdoc,
2014-present	Neelanjan Bose	Current Postdoc
2013- present	Tiffany Zee	Current postdoc
2012-present	Amit Sharma	Current Postdoc
2012-present	Kenneth Wilson	Current Graduate student
2017-present	Tyler Hilsabeck	Current Graduate student
2016-present	Jessica Ramirez	Current Masters student
2016-present	Austin Lim	Current Masters student
2016-present	Blaine Pattavina	Current Masters student

REFERENCES

1. Dr. Judith Campisi, Buck Institute for Aging Research.
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2. Dr. Marshall Stoller, UCSF
   Marshall.stoller@ucsf.edu

3. Dr. Anne Brunet, Stanford University.
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4. Dr. Gordon Lithgow, Buck Institute for Aging Research.
   Glithgow@buckinstitute.org