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Richard N. Kolesnick, MD

Our laboratory focuses on the role of sphingolipid signaling as a stress response. In this pathway, generation of the second messenger ceramide in response to diverse environmental and pharmacologic stresses (heat, ionizing radiation, ultraviolet light, chemotherapeutic agents, oxidative challenges, etc.) occurs either by degradation of sphingomyelin or by de novo synthesis. The quality and quantity of the ceramide response, in combination with other signals, determines whether adaptation or apoptosis ensues. This pathway is evolutionarily conserved and is obligate for the heat shock response in yeast.

Research Projects

- [Radiation Response Genes in the Worm *Caenorhabditis elegans*](#)
- [Role of Ceramide-rich Membrane Macrod domains in Response to Stress](#)
- [Requirement for Kinase Suppressor of Ras \(KSR\) in Ras-mediated Tumorigenesis](#)
- [Ionizing Radiation Targets Endothelium to Induce Normal and Neoplastic Tissue Damage](#)



Featured News

MEDIA ADVISORY

[Antibody Therapy Prevents Gastrointestinal Damage following Radiation Exposure in Mice](#)

A new study offers the first evidence of a drug capable of preventing lethal damage to the gastrointestinal (GI) tract caused by exposure to high levels of ionizing radiation, such as those occurring during a nuclear incident.

Publications Highlights

[Bodo S, Campagne C, Thin TH, Higginson DS, Vargas HA, Hua G, Fuller JD, Ackerstaff E, Russell J, Zhang Z, Klingler S, Cho H, Kaag MG, Mazaheri Y, Rimner A, Manova-Todorova K, Epel B, Zatzky J, Cleary CR, Rao SS, Yamada Y, Zelefsky MJ, Halpern HJ, Koutcher JA, Cordon-Cardo C, Greco C, Haimovitz-Friedman A, Sala E, Powell SN, Kolesnick R, Fuks Z. Single-dose radiotherapy disables tumor cell homologous recombination via ischemia/reperfusion injury. J Clin Invest. 2018; pii: 97631.](#)

[Martin ML, Zeng Z, Adileh M, Jacobo A, Li C, Vakiani E, Hua G, Zhang L, Haimovitz-Friedman A, Fuks Z, Kolesnick R*, Paty PB*. Logarithmic expansion of LGR5[±] cells in human colorectal cancer. Cell Signal. 2018; 42:97-105. doi: 10.1016/j.cellsig.2017.09.018. * Equal co-author.](#)

[Van Hell AJ, Haimovitz-Friedman A, Fuks Z, Tap WD, Kolesnick R. Gemcitabine kills proliferating endothelial cells exclusively via acid sphingomyelinase activation. Cell Signal. 2017; 34:86-91. doi: 10.1016/j.cellsig.2017.02.021.](#)

[Zhang L, Adileh M, Martin ML, Klingler S, White J, Ma X, Howe LR, Brown AM, Kolesnick R. Establishing estrogen-responsive mouse mammary organoids from single Lgr5⁺ cells. Cell Signal. 2017; 29:41-51. doi: 10.1016/j.cellsig.2016.08.001.](#)

[Hua G, Yan Pan CW, Zeng Z, Lee SG, Martin ML, Haimovitz-Friedman A, Fuks Z, Paty PB, Kolesnick R. Distinct levels of radioresistance in Lgr5⁺ colonic epithelial stem cells versus Lgr5⁺ small intestinal stem cells. Cancer Res 2017; 77:2124-2133. doi: 10.1158/0008-5472.CAN-15-2870.](#)

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People

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- Physician-scientist Richard Kolesnick studies the role of ceramide signaling in radiation-induced vascular dysfunction and tumor regression.
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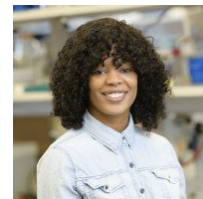


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Open Positions

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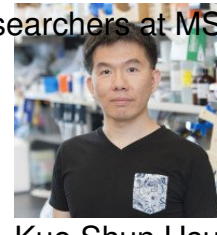
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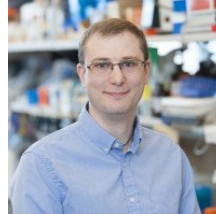
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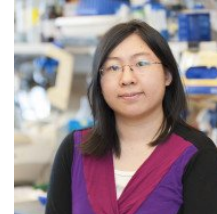
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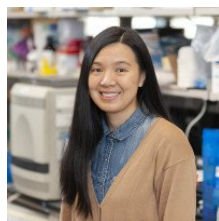
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Disclosures

Members of the MSK Community often work with pharmaceutical, device, biotechnology, and life sciences companies, and other organizations outside of MSK, to find safe and effective cancer treatments, to improve patient care, and to educate the health care community. These activities outside of MSK further our mission, provide productive collaborations, and promote the practical application of scientific discoveries.

MSK requires doctors, faculty members, and leaders to report (“disclose”) the relationships and financial interests they have with external entities. As a commitment to transparency with our community, we make that information available to the public. Not all disclosed interests and relationships present conflicts of interest. MSK reviews all disclosed interests and relationships to assess whether a conflict of interest exists and whether formal COI management is needed.

Richard N. Kolesnick discloses the following relationships and financial interests:

- Ceramedix

Equity; Intellectual Property Rights

The information published here is a complement to other publicly reported data and is for a specific annual disclosure period. There may be differences between information on this and other public sites as a result of different reporting periods and/or the various ways relationships and financial interests are categorized by organizations that publish such data.

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