# Dysregulated lipogenesis in cancer

**Toshiro Migita**

*Department of Molecular Medical Research,*
*Tokyo Metropolitan Institute of Medical Science*
*2-1-6 Kami-kitazawa, Setagaya-ku, Tokyo, Japan, 156-8506*

Most malignant cells exhibit elevated lipogenesis and generate lipids independent of extracellular fatty acids. *De novo* fatty acids or cholesterols are likely to be utilized for membrane composition, protein modification, and signal transduction, all of which are crucial for cell survival, proliferation, and transformation in cancer cells. There is growing evidence that *de novo* lipogenic enzymes, including ATP citrate lyase (ACLY), fatty acid synthase (FASN), acyl-CoA synthetase (ACS), are therapeutic targets in many cancers. We investigated the biological roles of these enzymes in cancer and found that they have differential effects on the functions of intracellular organelles. In this symposium, we will present the latest evidence that dysregulated lipogenesis confers a competitive survival advantage on cancer cells.

**Toshiro Migita**
Department of Molecular Medical Research
Tokyo Metropolitan Institute of Medical Science
E-mail: toshiro.migita@gmail.com

## EDUCATIONS/TRAINING

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| 1992: | Nagasaki University School of Medicine; M.D. |
| 1992-1996: | Department of the third Surgery, Tokyo Women's Medical University |
| 1996-1999: | Department of Urology, Kyushu University |
| 1999-2002: | Department of Anatomic Pathology, Kyushu University; Ph.D. |

## POSITIONS AND HONORS

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| 2002-2007: | Postdoctoral Fellow, Dana-Farber Cancer Institute, Boston, USA |
| 2007-2011: | Research Scientist, Division of pathology & Division of Molecular Biotherapy, Japanese Foundation for Cancer Research |
| 2011-2013: | Research Scientist, Department of Anti-Aging Medicine, The University of Tokyo |
| 2013- | Chief Researcher, Department of Molecular Medical Research, Tokyo Metropolitan Institute of Medical Science |
| 2010: | Outstanding performance award at Kanto-Hormone and Cancer Research |

## RECENT PUBLICATIONS

1. Hirashima K, Migita T, Sato S, Muramatsu Y, Ishikawa Y and Seimiya H. Telomere length influences cancer cell differentiation in vivo. ***Mol Cell Biol*** 33: 2988-2995, 2013.
2. Migita T, Okabe S, Ikeda K, Igarashi S, Sugawara S, Tomida A, Taguchi R, Soga T and Seimiya H. Inhibition of ATP citrate lyase induces an anticancer effect via reactive oxygen species: AMPK as a predictive biomarker for therapeutic impact. ***Am J Pathol*** 182: 1800-1810, 2013.
3. Migita T and Inoue S. Implications of the Golgi Apparatus in Prostate Cancer. ***Int J Biochem Cell Biol*** 44: 1872-1876, 2012.
4. Migita T, Ruiz S, Fornari A, Fiorentino M, Priolo C, Zadra G, Inazuka F, Grisanzio C, Palesandolo E, Shin E, Fiore C, Xie W, Kung AL, Febbo PG, Subramanian A, Mucci L, Ma J, Signoretti S, Stampfer M, Hahn WC, Finn S and Loda M. Fatty acid synthase: A metabolic enzyme and candidate oncogene in prostate cancer. ***J Natl Cancer Inst*** 101: 1-15, 2009.
5. Fiorentino M, Zadra G, Palescandolo E, Fedele G, Bailey D, Fiore C, Nguyen PL, Migita T, Zamponi R, Di Vizio D, Priolo C, Sharma C, Xie W, Hemler ME, Mucci L, Giovannucci E, Finn S and Loda M. Overexpression of fatty acid synthase is associated with palmitoylation of Wnt1 and cytoplasmic stabilization of $\beta$-catenin in prostate cancer. ***Lab invest*** 88: 1340-1348, 2008.
6. Migita T, Narita T, Nomura K, Miyagi E, Inazuka F, Matsuura M, Ushijima M, Mashima T, Seimiya H, Satoh Y, Okumura S, Nakagawa K and Ishikawa Y. ATP Citrate Lyase: Activation and Therapeutic Implications in Non-small Cell Lung Cancer. ***Cancer Res*** 68: 8547-8554, 2008.
7. Migita T, Baron A, Tang D and Loda M. Fatty acid synthase: a metabolic oncogene in prostate cancer? ***J Cell Biochem*** 91: 47-53, 2004.
8. Graner E, Tang D, Rossi S, Baron A, Migita T, Weinstein LJ, Lechpammer M, Huesken D, Zimmermann J, Signoretti S and Loda M. The isopeptidase USP2a regulates the stability of fatty acid synthase in prostate cancer. ***Cancer Cell*** 5: 253-261, 2004.