

GSK3 β in cancer cell metabolism

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Glycogen synthase kinase-3 β (GSK3 β), a serine/threonine protein kinase, regulates the fundamental cellular functions and participates in the major chronic, progressive diseases including glucose intolerance, neurodegenerative diseases and osteoporotic disorder. Unlike its effects against the several proto-oncoproteins (eg., β -catenin, cyclin D1) and mediators of epithelial-mesenchymal transition (eg., snail), we have uncovered that GSK3 β facilitates progression of colon, stomach, pancreatic and liver cancers, glioblastoma and osteosarcoma. This stems from the observation that GSK3 β promotes cell survival, proliferation and invasion via modulating the tumor suppressor and cell immortality pathways and cell motility machinery; and renders cancer cells insusceptible to chemotherapeutic agents and ionizing radiation. A series of our observations together with the previous studies establish GSK3 β as a common and attractive therapeutic target in the major adult-onset chronic diseases including cancer. Here we highlight the previously unrecognized role for GSK3 β in mediating the aberrant glucose and energy metabolism, the most primitive and challenging hallmark of cancer.

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EDUCATIONS/TRAINING

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1983-1987 Kanazawa University Graduate School of Medicine, Japan, MD & PhD
1987-1989 Department of Surgery, Kanazawa University Cancer Research Institute Hospital, Japan, resident
1997 Molecular Carcinogenesis Program, Naylor Dana Institute of Disease Prevention, American Health Foundation, Valhalla, NY, postdoctoral research fellow

POSITIONS AND HONORS

- 1990 Staff Surgeon: Toyama Teishin Hospital, Japan
1991-1992 Assistant Professor and Staff Surgeon: Department of Surgery, Cancer Research Institute and Hospital, Kanazawa University, Japan
1992-1994 Research Scientist: Biochemistry Division, National Cancer Center Research Institute, Tokyo, Japan
1994-1997 Assistant Professor and Staff Surgeon: Department of Surgery, Cancer Research Institute and Hospital, Kanazawa University, Japan
1998 Lecturer: Derald H. Rittenberg Cancer Center, Mount Sinai School of Medicine, New York, NY
1998-2001 Associate Professor and Staff Surgeon: Division of Translational and Clinical Oncology, Cancer Research Institute, and Department of Surgical Oncology, Kanazawa University and Hospital, Kanazawa, Japan
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RECENT PUBLICATIONS

1. Pyko IV, Nakada M, Sabit H, Lei T, Furuyama N, Hayashi Y, Kawakami K, Minamoto T, Fedlau AS and Hamada JI. Glycogen synthase kinase 3 β inhibition sensitizes human glioblastoma cells to temozolomide by affecting O⁶-methylguanine DNA methyltransferase promoter methylation via c-Myc signaling. *Carcinogenesis* 34: 2206-2217, 2013.
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