BIOGRAPHICAL SKETCH

NAME: Goswami, Moloy Tarun

COMMONS USER NAME (credential, e.g., agency login): goswamim

POSITION TITLE: Research Scientist Specialist

EDUCATION/TRAINING

| INSTITUTION AND LOCATION | DEGREE  (if applicable) | Completion Date  MM/YYYY | FIELD OF STUDY |
| --- | --- | --- | --- |
| K.J. Somaiya College, Bombay University, India | BS | 06/1994 | Biochemistry & Microbiology |
| M.S. University, Baroda, India | MS | 06/1993 | Biotechnology |
| Indian Institute of Science, Bangalore, India | PhD | 05/2002 | Molecular Biology |
| National Institute of Health, Bethesda, USA  University of Michigan, Ann Arbor, USA | Visiting Scientist  Postdoctoral fellow | 05/2007  11/2018 | Developmental Neurobiology  Cancer Biology and Genomics |

# A. Personal Statement

Presently, I am researcher at Ophthamology, Kellogg Eye Center and Visual Sciences, University of Michigan. Earlier, I worked in Department of Internal Medicine and Pathology, University of Michigan with several aspects of cancer biology and genomics. Briefly, I discovered that during lung cancer metastasis, CD59, a transmembrane repressor of complement dependent cytotoxicity is induced by transforming growth factor beta and allows metastatic cells to escape innate immune immunesurveillance. I found that prostate and lung cancers overexpress de novo purine biosynthetic genes, PAICS and PPAT, which modulate PKM2 enzyme activity. PAICS and PPAR are potentially targetable and are attractive biomarkers. Recently, I have focused in three independent projects. Firstly, we identified that TP53-perturbed cancers are dependent on TPRKB (TP53 regulatory kinase binding protein), an understudied tRNA-modifying gene, making it an attractive target across pan cancers that carry TP53 mutation. Secondly, through collaborations with MD Anderson and Dr. Kathy Cooney, we identified rare and novel mutations; viz. in androgen-independent castrate resistant prostate cancers (AR--CRPCs) we identified activating mutations in MET, HRAS and NRAS while in patients with genetic pre-disposition to early and/or aggressive cancers we identified a KRAS variant, *KRAS*4A-X. I have carried out extensive functional characterization of the HRAS and NRAS mutants and identified p-ERK-1/2 inhibitor, Trametinib as potential inhibitor of HRAS and NRAS activating mutant driven AR-CRPCs in pre-clinical models. Presently, I have focused in studying photoreceptors whose metabolic requirements are comparable to neoplastic tissue. Specifically, I am studying role of PKM2 and glutamine in photoreceptor survival in cell line and rodent models.

**Peer-Reviewed Publications**

1. **Goswami MT**, VanDenBerg KR, Han S, Wang LL, Singh B, Weiss T, Barlow M, Kamberov S, Wilder-Romans K, Rhodes DR, Feng FY, Tomlins SA. 2019 Identification of TP53RK (TPRKB) dependency in TP53-deficient cancers. *Mol Cancer Res* 16: 1125-37 PMID: 31110156
2. Chakravarthi BVSK, Chandrashekar DS, Agarwal S, Balasubramanya SAH, Pathi SS, **Goswami MT,** et al. 2018a. miR-34a Regulates Expression of the Stathmin-1 Oncoprotein and Prostate Cancer Progression. *Mol Cancer Res* 16: 1125-37
3. Kanungo J, **Goswami M**, Pant HC 2018. Notch and Cdk5 in Zebrafish *Mindbomb* Mutant: Co-regulation or Coincidence? Folia Biologica 64: 35-40
4. **Goswami MT**, Reka AK, Kurapati H, Kaza V, Chen J, et al. 2016. Regulation of complement-dependent cytotoxicity by TGF-beta-induced epithelial-mesenchymal transition. *Oncogene* 35: 1888-98
5. Chakravarthi B**\***, **Goswami MT\***, Pathi SS, Dodson M, Chandrashekar DS, et al. 2017. Expression and role of PAICS, a de novo purine biosynthetic gene in prostate cancer. *Prostate* 78: 693-94 (**\* Co first author**)
6. **Goswami MT**, Chen G, Chakravarthi BV, Pathi SS, Anand SK, et al. 2015. Role and regulation of coordinately expressed de novo purine biosynthetic enzymes PPAT and PAICS in lung cancer. *Oncotarget* 6: 23445-61
7. Chakravarthi BV, Pathi SS**\***, **Goswami MT\***, Cieslik M, Zheng H, et al. 2014. The miR-124-prolyl hydroxylase P4HA1-MMP1 axis plays a critical role in prostate cancer progression. *Oncotarget* 5: 6654-69 **(\*Equal Contribution)**
8. Bhan U, Newstead MJ, Zeng X, Podsaid A, **Goswami M**, et al. 2013. TLR9-dependent IL-23/IL-17 is required for the generation of Stachybotrys chartarum-induced hypersensitivity pneumonitis. *J Immunol* 190: 349-56
9. Reka AK, **Goswami MT**, Krishnapuram R, Standiford TJ, Keshamouni VG. 2011. Molecular cross-regulation between PPAR-gamma and other signaling pathways: implications for lung cancer therapy. *Lung Cancer* 72: 154-9
10. Kanungo J, Li BS, **Goswami M**, Zheng YL, Ramchandran R, Pant HC. 2007. Cloning and characterization of zebrafish (Danio rerio) cyclin-dependent kinase 5. *Neurosci Lett* 412: 233-8
11. **Goswami MT**, Desai KV, Kondaiah P. 2003. Comparative functional analysis of rat TGF-beta1 and *Xenopus laevis* TGF-beta5 promoters suggest differential regulations. *J Mol Evol* 57: 44-51

**Honors and Awards**-

# B. Positions and Honors

Positions and Employment

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| --- | --- |
| 2002-2007 | Visiting Scientist, National Institute of Child Health Development (NICHD), Bethesda, MD |
| 2009-2014 | Postdoctoral Fellow, University of Michigan, ANN ARBOR, MI |
| 2014 - | Research Scientist, University of Michigan, ANN ARBOR, MI |

Other Experience and Professional Memberships

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| --- | --- |
| 2003 - | Member, American Association for Cell and Developmental Biology, USA |
| 2012 & 2017 | Member, American Association of Cancer Research |

Honors

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| 1994 | Graduate Aptitude Test in Engineering, 96.41 percentile, 124th All India Rank Holder |
| 1996 | Junior Research Fellowship, Council for Industrial and Scientific Research, India |
| 1998 | Senior Research Fellowship, Council for Industrial and Scientific Research, India |

# C. Contribution to Science

1. We identified CD59 as transforming growth factor beta induced gene that represses complement induced cytotoxicity in metastatic lung cancers and allows them to escape immunesurveillance. The work was proof of concept to use inhibitor/s of CD59 as adjuvant to antibody therapy in lung cancers.
   1. **Goswami MT**, Reka AK, Kurapati H, Kaza V, Chen J, et al. 2016. Regulation of complement-dependent cytotoxicity by TGF-beta-induced epithelial-mesenchymal transition. *Oncogene* 35: 1888-98 PubMed PMID: 26148233.
2. We identified de novo purine biosynthetic gene, PAICS and PPAT are overexpressed in prostate and lung cancers and modulate PKM2 activity. PKM2 expression and activity is up-regulated in cancers through activation of aerobic glycolysis; our work identified alternate ways by which PKM2 activity abrogated and thereby revealed that PAICS and PPAT are potentially targetable.
3. **Goswami MT**, Chen G, Chakravarthi BV, Pathi SS, Anand SK, et al. 2015. Role and regulation of coordinately expressed de novo purine biosynthetic enzymes PPAT and PAICS in lung cancer. *Oncotarget* 6: 23445-61 PubMed PMID: 26140362.
4. Chakravarthi B**\***, **Goswami MT\***, Pathi SS, Dodson M, Chandrashekar DS, et al. 2017. Expression and role of PAICS, a de novo purine biosynthetic gene in prostate cancer. *Prostate* 78: 693-94 (**\* Co first author**) PubMed PMID: 27550065.
5. Recently through *in silico* analyses of Project Achilles (Broad Institute) we identified TPRKB, an understudied tRNA-modifying protein as susceptibility gene in TP53-perturbed cancers. Furthermore, we extensively characterized TPRKB function using various loss-of-function models (knockouts, knockdowns) in cell line lines and mouse models of TP53 wildtype and mutant backgrounds and nominate it as targetable protein in TP53-defiicent cells.
   1. **Goswami MT**, VanDenBerg KR, Han S, Wang LL, Singh B, Weiss T, Barlow M, Kamberov S, Wilder-Romans K, Rhodes DR, Feng FY, Tomlins SA. 2019 Identification of TP53RK (TPRKB) dependency in TP53-deficient cancers. *Mol Cancer Res* 16: 1125-37 PMID: 31110156