Alok Ranjan, PhD

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Research Experience Summary

I have over five years of research experience in cancer cell biology, molecular biology, cancer signaling, several mouse tumor models, immuno-oncology, and translational studies using cell-based assays and basic molecular biology techniques. I accomplished Ph.D. with multiple first author publications in peer-reviewed journals, awards and research grants from national organizations. Currently, working at National Institute of Health (NIH)/ National Cancer Institute (NCI), Clinical Center, Bethesda, MD as postdoctoral fellow.

Education

Ph.D. (Pharmaceutical Sciences) GPA: 3.8 — Texas Tech University Health Sciences Center, Texas (2012-2016)

B.S (Pharmaceutical Sciences) GPA: 4.0 (Ranked # 1 in University for two consecutive years) — Muzaffarpur Institute of Technology, India (2006-2010)

Work Experience

Postdoctoral Fellow — National Institute of Health, Bethesda, MD (March 2017-present)

Production Scientist — Alkem Labs Ltd., Sikkim, India (2010-2012)

Technical Skills

- Molecular Biology: Experienced in molecular biology procedures such as transformation, lentiviral transduction, and transfection to make stable, genetically manipulated cell lines using CRISPER/Cas9 and shRNA. DNA / RNA extraction, making cDNA, RT-PCR, q-PCR and ELISA assays.
- Cancer Biology/Biochemistry: Proficient in immunocytochemistry, immunoprecipitation, immunoflorescence, immunohistochemistry, H&E staining, TUNEL assay, western blotting, annexinV/FITC apoptosis assay, reactive oxygen species assay (ROS), cell cycle analysis, cell proliferation assays, acridine orange assay, lysotracker assay and other related assays and tools.
- Mouse Tumor Model: Hands-on experience in intracranial, intracardiac, tailvein, intrasplenic, subcutaneous and orthotopic implantation of tumors in mice. Drug administration in to the mouse by oral gavage, retro-orbital and intraperitoneal routes, live animal imaging using IVIS caliper (Perkin Elmer), collection of blood by cardiac puncture, organs collection as well as dissection of the brain into hippocampus, medulla, cerebrum, cerebellum, pons and plasma analysis for liver enzymes such as ALT/AST/LDH. Experienced in patient derived xenograft models (PDX) and 3D culture (tumorsphere).
- Immuno-oncology: Isolation of peripheral blood mononuclear cells (PBMCs) from mouse and human blood. Staining of immune cells. Evaluated effect of anti-cancer drugs on immune cells such as myeloid derived suppressor cells (MDSCs), macrophages (M1 and M2) and regulatory T cells using Flow cytometer.
- Cell Signaling: Proficient in studying drug mechanism of action *in vitro* and *in vivo*.

Publications

- Monish Makena* and **Alok Ranjan*** (*co-first authorship) et al. "Cancer Stem Cells: Road to therapeutic resistance and strategies to overcome resistance" BBA-Molecular Basis of Disease PMID: 30481586
- Parul Gupta, Nehal Gupta, Neel Fofaria, **Alok Ranjan** and Sanjay Srivastava "HER2-mediated GLI2 stabilization promotes anoikis resistance and metastasis of breast cancer cells" Cancer Letters PMID:

30409762

- **Alok Ranjan** and Sanjay K. Srivastava "Penfluridol suppresses glioblastoma tumor growth by Akt-mediated inhibition of GLI1" Oncotarget PMID: 28380428
- **Alok Ranjan,** Stephen Wright and Sanjay K. Srivastava "Immune consequences of penfluridol treatment associated with glioblastoma tumor growth" Oncotarget PMID: 28512255
- **Alok Ranjan**, Parul Gupta and Sanjay K. Srivastava "Penfluridol: an antipsychotic drug suppresses metastatic tumor growth in triple negative breast cancer by inhibiting integrin signaling axis" Cancer Research PMID: 26627008
- **Alok Ranjan** and Sanjay K. Srivastava "Penfluridol suppresses pancreatic tumor growth by autophagy mediated apoptosis" Scientific Reports PMID: 27189859
- **Alok Ranjan** and Sanjay K. Srivastava "Penfluridol induces endoplasmic reticulum stress leading to autophagy in pancreatic cancer" Tumor Biology PMID: 28618969
- **Alok Ranjan,** Neel Fofaria and Sanjay K. Srivastava "Modulation of signal transduction pathways by natural compounds in cancer" Chinese Journal of Natural Medicine PMID: 26481373
- Neel Fofaria, **Alok Ranjan**, SH Kim and Sanjay K Srivastava "Mechanisms of the Anticancer Effects of Isothiocyanates" Enzymes PMID: 26298458
- Kartick Pramanik, Neel Fofarial, Parul Gupta, **Alok Ranjan**, SH Kim and Sanjay K Srivastava "Inhibition of β-catenin signaling suppresses pancreatic tumor growth by disrupting nuclear β-catenin/TCF-1 complex: critical role of STAT-3" Oncotarget PMID: 25869100
- J Lu et al. "Syntheses, neural protective activities, and inhibition of glycogen synthase kinase-3β of substituted quinolines" Bioorganic & medicinal chemistry letters PMID: 24951331

Selected Presentations (Total presentations at conferences such as AACR, SOT and AAPS# 22)

- Alok Ranjan et al. "MBD3 stabilizes MYC leading to metastatic outgrowth of pancreatic cancer in the liver" American Association for Cancer Research- Pancreatic Cancer: Advances in Science and Clinical Care, September 6-9, 2019, Boston, Abstract# C44.
- Itishree Kaushik, **Alok Ranjan**, Blake Schwettmann and Sanjay Srivastava "Pimozide suppresses the growth of brain tumor by targeting oncogenic pathways" American Association for Cancer Research, April 14-18, 2018, Chicago, IL, Proc. Am. Assoc. Can. Res. Vol 59, 2018, Abstract # 5452
- **Alok Ranjan**, Nehal Gupta and Sanjay Srivastava "Immune consequences of penfluridol treatment associated with inhibition of glioblastoma tumor growth" American Association for Cancer Research, April 1-5, 2017, Washington, D.C, Proc. Am. Assoc. Can. Res. Vol 58, 2017, Abstract # 178
- **Alok Ranjan**, Sharavan Ramachandran, Nehal Gupta and Sanjay Srivastava "Penfluridol-induced endoplasmic reticulum stress leads to autophagy-mediated pancreatic tumor growth suppression" American Association for Cancer Research, April 1-5, 2017, Washington, D.C, Proc. Am. Assoc. Can. Res. Vol 58, 2017, Abstract # 1625.
- **Alok Ranjan** and Sanjay Srivastava "Penfluridol suppresses glioblastoma tumor growth by Akt mediated inhibition of sonic hedgehog signaling" American Association for Cancer Research, April 16-20, 2016; New Orleans, Louisiana, Proc. Am. Assoc. Can. Res. Vol 57, 2016, Abstract # 2915
- Neel Fofaria, **Alok Ranjan**, Hussaini Syed Sha Qhattal, Xinli Liu and Sanjay Srivastava "Nanoemulsion formulation for anticancer agent piplartine characterization, toxicological, pharmacokinetics and efficacy studies" American Association for Cancer Research, April 16-20, 2016; New Orleans, Louisiana, Proc. Am. Assoc. Can. Res. Vol 57, 2016, Abstract # 2062
- **Alok Ranjan** and Sanjay Srivastava " Penfluridol suppresses glioblastoma tumor growth by inhibiting sonic hedgehog signaling". Society of Toxicology, March 13-17, 2016; New Orleans, LA. Abstract # 2078
- **Alok Ranjan**, Parul Gupta and Sanjay K. Srivastava. "Brain metastasis of breast cancer suppression by

penfluridol" American Association for Cancer Research - Advances in Breast Cancer Research, October 17-20, 2015; Bellevue, WA. Abstract # A68

- **Alok Ranjan** and Sanjay K. Srivastava. "Penfluridol Suppresses In Vivo Pancreatic Tumor Growth by Autophagy Mediated Apoptosis". American Association of Pharmaceutical Scientists, National Biotechnology Conference, June 8-10, 2015; San Francisco, CA, Poster #: W3009
- **Alok Ranjan**, Parul Gupta and Sanjay Srivastava. "Penfluridol suppresses triple negative breast cancer metastasis to brain by inhibiting α6β4 integrins". American Association for Cancer Research, April 18-22, 2015; Philadelphia, PA, Proc. Am. Assoc. Can. Res. Vol 56, 2015, Abstract # 5504
- Parul Gupta, **Alok Ranjan** and Sanjay Srivastava "GLI2 inhibition suppresses metastasis of HER2+ breast cancer" April 18-22, 2015; Philadelphia, PA, PA, Proc. Am. Assoc. Can. Res. Vol 56, 2015, Abstract # 2256
- **Alok Ranjan**, Ashlee Birkenfeld, Jianyu Lu, Duy Hua and Sanjay K. Srivastava. "GS-19, a novel GSK inhibitor suppresses the growth of pancreatic cancer cells by inhibiting EGFR/AKT/STAT-3 signaling." American Association for Cancer Research, April 5-9, 2014; San Diego, CA. Proc. Am. Assoc. Can. Res. Vol 55, 2014, Abstract # 4115

Research Experience

Postdoctoral Fellow at National Institute of Health: March 2017-present (Surgical Oncology Program)

Primary responsibility is to interrogate the mechanistic role of the genes the lab has identified in cDNA and CRISPER/Cas9 *in vivo* screening as being the regulators of the metastasis cascade and reactivation of dormant cancer cells. Investigation involve the employment of the cellular and molecular biology techniques as well as the use of multi-photon microscopy using cancers cell lines, several mouse models, ex-vivo models and in patients tissues as a proof of concept. We aim to identify the predictive biomarker signature for dormancy and metastasis which can be employed in precision medicine. We have identified a novel regulation of MYC oncoprotein stability in cancer cells, which drives for liver metastasis. This project has high clinical impact and further investigation of this previously undescribed mechanism may lead to new therapeutic targeting of MYC for patients with pancreatic cancer. Role of immune cells in metastasis is also studied in a novel ex-vivo model, made of human liver capsule in the lab.

Graduate Student at Texas Tech University: 2012 – 2016 (Cancer Biology and Immuno-Oncology)

Selected projects:

Project 1: Penfluridol: An antipsychotic agent suppresses metastatic tumor growth in triple negative breast cancer by inhibiting α6β4 integrin signaling axis (PMID: 26627008). Designed *in vitro* cell based assays, using cellular and molecular biology procedures to delineate penfluridol mechanism of action in suppressing breast cancer progression and its metastasis. Performed orthotopic tumor implantation in breast, intracardiac and intracranial implantation of tumors to study anti-tumor efficacy as well as safety profile of penfluridol in mouse models.

Project 2: Suppression of brain tumor growth by antipsychotic drug (PMID: 28380428). Established that penfluridol suppresses glioblastoma tumor growth by inhibiting Akt-mediated GLI1 signaling, using genetically manipulated human adult and pediatric glioblastoma cell lines generated using shRNA, CRISPER and known pharmacological inhibitors. Established intracranial mouse model of brain tumor in lab.

Project 3: Immune consequences associated with glioblastoma tumor suppression by penfluridol (PMID: 28512255). Effect of anti-cancer drug on myeloid derived suppressor cells (MDSCs), lymphocytes, regulatory T cells (Treg) and macrophages (M1 and M2) was evaluated. Role of anti-cancer drug treatment on inflammation was also studied using ELISA. Human PBMC was isolated and injected in SCID mice, experiments were performed to evaluate the effect of anti-cancer drug treatments on human immune cells.

Project 4: Penfluridol suppresses pancreatic tumor growth by autophagy mediated apoptosis (PMID: 27189859). Pancreatic tumor growth suppression by anti-cancer drug induced autophagy leading to apoptosis was established both *in vitro* and *in vivo* by using several pharmacological inhibitors and genetic manipulations in human pancreatic cancer cell lines. In vitro observation was further confirmed *in vivo* in pancreatic cancer mouse models.

Industry Experience

Production Scientist at Alkem Labs Ltd. , India

- Supervising and managing of cephalosporin block tablet production as per US FDA guidelines.
- Maintenance of records.
- Work in collaboration with quality assurance and quality control team to efficiently manage the production and meet the strict deadlines.
- Drafting of Standard Operating Procedures.

Awards and Honors

• Lead judge (Graduate Student Symposium and Postbac Presentation, National Institute of Health)	2019
• Judge (Graduate Student Symposium, National Institute of Health)	2018
• Outstanding Graduate Student Award (Texas Tech University)	2017
• Awarded Grant Funding in Human Health Applications of New Technologies (Role: Principal Investigator)	2015-2016
• Travel Awards	2014, 2015, 2016 and 2017
• Graduate Student Research Award in Biotechnology (AAPS)	2016
• Mary Lou Clement Mann Endowed Scholarship (Texas Tech University Health Science Center, TTUHSC)	2014 and 2016
• Young Investigator Fellowship Award (MD Anderson Cancer Center, TX)	2016
• Outstanding poster presentation award (TTUHSC)	2014 and 2016
• Best Seminar Award (TTUHSC)	2016
• Graduate Student Best Abstract Award (ASIO, SOT)	2016
• Young Investigator Award (AAISCO, AACR)	2015
• Scholar-In-Training Award (AACR)	2015
• Third place at Carcinogenesis Specialty Section Group (SOT)	2014

Invited Talks/Oral Presentations

- 2016: Invited speaker, Syngenta (Greensboro, North Carolina)
- 2015: Invitation as speaker (Indo-Global Pharma Expo & Summit) Hyderabad, India
- 2014: Podium presentation (Lubbock Research Week, Texas Tech University Health Sciences Center)
- 2014: Podium presentation (Lone Star Regional Chapter, Society of Toxicology)

Mentoring and Managing Experience

- Supervision of interns in lab (2013, 2014 and 2015).
- Teaching assistant in drug design and discovery labs and facilitator in patients case studies

for pharm D. students (2015 and 2016).

- Collaborative projects- Worked on multiple collaborative projects as indicated in publications.

Referee/Reviewer (Peer Review Journal)

- Oncotarget
- Journal of Experimental & Clinical Cancer Research
- International Journal of Molecular Sciences
- Biomedicines
- International Journal of Environmental Research and Public Health
- Journal of Cancer
- Journal of Carcinogenesis and Mutagenesis
- Journal of Clinical and Translational Hepatology
- Tumor Biology
- American Association of Pharmaceutical Scientists (Cancer Moonshot: Emerging Modalities for Oncology)
- Drug and Chemical Toxicology

Total reviews as a reviewer in journals # 30

Editorial Board Member (Peer Review Journal)

- Journal of Clinical and Translational Hepatology (JCTH)
- Clinical Investigation (London)
- Journal of Biomedical Sciences
- MDPI (Topic Editor)

Leadership

- American Association of Pharmaceutical Scientist, Student Chapter
  Chair (2016), Chair elect (2015) and Treasurer (2014),
- Graduate Student Association
  Historian (2014) and Treasurer (2015)

Scientific/Community Services

- 2019: Lead judge in 15th Annual Graduate Student Research Symposium organized at National Institute of Health (NIH)
- 2018: Judge in 14th Annual Graduate Student Research Symposium organized at National Institute of Health (NIH)
- 2018: Poster judging for Postbac poster days at National Institute of Health
- 2017: Poster judging during Postbac poster days organized at National Institute of Health (NIH)
- 2016: Participated in fund raising event to support Tatum's (a five year old girl) fight against cancer
- 2015: Participated in donation drive for Goodwill, Amarillo, TX.
- 2015: Habitat for Humanity, Painting and setting home for needy people, Amarillo, TX.
- 2015: Participated in Salvation Army, Amarillo community service

- 2014: JDRF walk to raise funds for type 1 Diabetes research
- 2014: Participated in donation drive for Goodwill, Amarillo, TX
- 2011: Volunteer in Blood Donation Camp, Sikkim, India
