IKJOT SINGH SOHAL, Ph.D.

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Research Interests

I am an early-stage investigator with expertise in nanotoxicology and cancer biology. My research program investigates tumor-host crosstalk and its therapeutic targeting. This includes understanding tumor-host interactions during early stages of cancer progression, therapy resistance, and metastasis as well as development of RNA-based therapeutics to target cancer-promoting crosstalk. We employ a combination of *in vitro* and *in vivo* models, bioinformatics, omics technologies, and advanced RNA modification approaches. My work has received funding from major institutions including the National Cancer Institute and the Department of Defense. I am equally committed to the growth of the next generation of scientists through individualized mentorship, rigorous training, and collaborative science.

Education

2013 – 2018	**Ph.D. Biomedical Engineering & Biotechnology** University of Massachusetts-Lowell Thesis Advisor: Dhimiter Bello, Sc.D., M.Sc. Thesis: Engineered nanomaterials in food: Assessing their behavior and impact in the gastrointestinal tract
2008 – 2012	**B.Sc. Biotechnology (Honors)** Punjab Agricultural University, India

Positions

2025 – current	Assistant Professor, Department of Biological Sciences, University of North Texas, Denton, TX
2026 – current	Member, Biodiscovery Research Institute, University of North Texas, Denton, TX
2024 – 2025	Research Associate, Purdue University Institute for Cancer Research, Purdue University, West Lafayette, IN (Mentor: Andrea Kasinski, Ph.D.)
2024 – 2025	Founding President, Society of Research Fellows, Purdue University Institute for Cancer Research (Mentor: Dorothy Teegarden, Ph.D.)
2018 – 2024	Postdoctoral Research Associate, Purdue University Institute for Cancer Research, Purdue University, West Lafayette, IN (Mentor: Andrea Kasinski, Ph.D.)
2016 – 2018	Visiting Research Fellow, Harvard T.H. Chan School of Public Health, Harvard University, Boston, MA (Mentor: Philip Demokritou, Ph.D.)
2014 – 2018	Graduate Teaching Assistant, University of Massachusetts-Lowell, Lowell, MA
2013 – 2018	Graduate Research Fellow, University of Massachusetts-Lowell, Lowell, MA (Mentor: Dr. Dhimiter Bello, Sc.D., M.Sc.)

Awards

2025	**Young Investigator Award** (American Association of Indian Scientists in Cancer Research)
2025	**Outstanding Service and Engagement Award** (Purdue Institute for Cancer Research)
2024	**Outstanding Postdoctoral Researcher Award** (Purdue Institute for Cancer Research)
2024	**Employee Recognition Award** (Department of Biological Sciences, Purdue University)
2023	**Purdue Postdoc Mentor Award** (The Graduate School at Purdue University)
2022	**Purdue Postdoc Travel Grant** (for attending AACR 2022)
2022	**Young Investigator Award** (7th Midwest Tumor Microenvironment Meeting)

Peer-Reviewed Publications

Complete List of Published Work: NCBI My Bibliography

†First author, *Corresponding author, Me, Postdoc, Graduate student, Undergraduate student, TAMS student, Other

Research articles:

1. Abdelaal AM, Sohal IS*, Iyer SG, Sudarshan K, Orellana EA, Ozcan K, Santos AP, Low P, and Kasinski AL*. "Selective targeting of chemically modified miR-34a to prostate cancer using a small molecule ligand and an endosomal escape agent." *Molecular Therapy – Nucleic Acids* (2024). Full Text
2. Abdelaal A, Sohal IS*, Iyer S, Kasireddy S, Lanman N, Kothandaraman H, Low P, and Kasinski A*. "A first-in-class fully modified version of miR-34a with outstanding stability, activity, and anti-tumor efficacy." *Oncogene* (2023). Full Text
    - *The article is in the top 5% of all research outputs ever tracked by Altmetric* (Link).
    - *Featured by Purdue University* (Link) *and 31 other news outlets globally* (Link).
3. Dar MS, Mensah IK, He M, McGovern S, Sohal IS, Whitlock HC, Bippus NE, Ceminsky M, Emerson ML, Tan HJ, Hall MC, Gowher H*. "Dnmt3bas coordinates transcriptional induction and alternative exon inclusion to promote catalytically active Dnmt3b expression." *Cell Reports* (2023). Full Text
4. Kaur J†, Sohal IS†, Singh H, Gupta NK, Sehrawat S, Puri S, Bello D*, Khatri M*. "Toxicity screening and ranking of diverse engineered nanomaterials using hierarchical testing approaches with an in vivo zebrafish model." *Environmental Science: Nano* (2022). Full Text
5. Hasan H†, Sohal IS†, Soto-Vargas Z†, Byappanahalli, AM, Humphrey SE, Kubo H, Kitdumrongthum S, Copeland S, Tian F, Chairoungdua A, Kasinski AL*. "Extracellular vesicles released by non-small cell lung cancer cells drive invasion and permeability in non-tumorigenic lung epithelial cells." *Scientific Reports* (2022). Full Text
    - *This article is in the top 25% of all research outputs ever tracked by Altmetric* (Link)
6. Pal AS†, Agredo A†, Lanman NA, Son J, Sohal IS, Bains M, Li C, Clingerman J, Gates K, Kasinski AL*. "Loss of KMT5C Promotes EGFR Inhibitor Resistance in NSCLC via LINC01510-Mediated Upregulation of MET." *Cancer Research* (2022). Full Text

- *The article is among the top 5% of all research outputs ever tracked by Altmetric* (Link).

7. Sohal IS†, DeLoid GM†, O'Fallon KS, Gaines P, Demokritou P*, Bello D*. "Effects of ingested food-grade titanium dioxide, silicon dioxide, iron (III) oxide and zinc oxide nanoparticles on an in vitro model of intestinal epithelium: Comparison between monoculture vs. a mucus-secreting coculture model." *NanoImpact* (2020). Full Text
8. Sohal IS*, Cho YK, O'Fallon KS, Gaines P, Demokritou P, Bello D*. "Dissolution Behavior and Biodurability of Ingested Engineered Nanomaterials in the Gastrointestinal Environment." *ACS Nano* (2018). Full Text
    - *In May 2019, the article was highlighted by ACS Nano (#1 journal in the field of nanoscience and nanotechnology) in a virtual collection of most recent notable developments in the field of Nanosafety research* (Link)
9. DeLoid GM†, Sohal IS, Lorente LR, Molina RM, Pyrgiotakis G, Stevanovic A, Zhang R, McClements DJ, Geitner NK, Bousfield DW, Ng KW, Loo SCJ, Bell DC, Brain J, Demokritou P*. "Reducing Intestinal Digestion and Absorption of Fat Using a Nature-Derived Biopolymer: Interference of Triglyceride Hydrolysis by Nanocellulose." *ACS Nano* (2018). Full Text
    - *The article is in the top 5% of all research outputs ever tracked by Altmetric* (Link).
    - *Featured by Harvard School of Public Health* (Link) *and 9 other news outlets globally* (Link).
10. Lee S†, Sohal IS, Therrien MA, Pal AK, Bello D, Shea TB*. "Additive impairment of synaptic signaling in cultured cortical neurons by exogenously-applied oligomerized amyloid-β and airborne nanoparticles generated during photocopying." *Journal of Alzheimer's Disease* (2015). Full Text

Review articles:

1. Iyer SG†, Sohal IS, and Kasinski AL*. "Redesigning miR-34a: structural and chemical advances in the therapeutic development of a miRNA anti-cancer agent." *Biochemical Society Transactions* (2025). Full Text
2. Sohal IS†, Kasinski, A*. "Emerging diversity in extracellular vesicles and their roles in cancer". *Frontiers in Oncology* (2023) (invited review). Full Text
3. Sohal IS*, O'Fallon KS, Gaines P, Demokritou P, Bello D*. "Ingested engineered nanomaterials: state of science in nanotoxicity testing and future research needs." *Particle and Fibre Toxicology* (2018). Full Text

Book chapters:

1. Liu X, Zhang B, Sohal IS, Bello D, Chen H. "Is "nano safe to eat or not"? a review of the state-of-the art in soft engineered nanoparticle (sENP) formulation and delivery in foods." *Advances in Food and Nutrition Research* (2019). Full Text

Articles submitted:

1. Sohal IS*, Pal AK, Lepine J, Liu P, Wisnewski AV, Redlich CA, Bello D*. "A cross-week analysis of urinary extracellular vesicles after respiratory tract exposure intervention identifies systemic signaling changes – a pilot study of isocyanate-exposed workers." bioRxiv (2026). Full Text

Patents and Disclosures

2022 - present **Folate-fully-modified miR-34a as an anti-cancer agent.**
United States 63/454,177 Filed: 2022

Conference Presentations

Presenter, Me, Postdoc, Graduate student, Undergraduate student, TAMS student, Other

Presentations

1. Sohal IS. "Investigating intercellular crosstalk biology that drives immunosuppressive cancers and its therapeutic targeting." UNT Biodiscovery Institute Seminar Series (2026)
2. Piltan S, Hasan H, Sohal IS, Pandey A, Urdaneta D, Lanman N, Utturkar S, Kasinski AL. "Selective sorting of tumor suppressive and oncogenic miRNAs into extracellular vesicles: Implications for cancer progression." American Association for Cancer Research (AACR) Annual Meeting (2025)
3. Sohal IS. "The origin and regulation of immunosuppressive extracellular vesicles." Purdue Biological Sciences Department Retreat (2024)
4. Hasan H, Lanman NA, Utturkar S, Jauch JJ, Sohal IS, Soto-Vargas ZM, Kasinski AL. "Mediators of RNA sorting and export in non-small cell lung cancer derived extracellular vesicles." American Association for Cancer Research (AACR) Annual Meeting (2023)
5. Sohal IS, Hasan H, Soto-Vargas Z, Kasinski AL. "Extracellular vesicles of highly metastatic lung cancer cells promote intravasation by disrupting epithelial barrier and inducing epithelial-to-mesenchymal plasticity in a 16-day mature bronchial epithelium." 7th Annual Midwest Tumor Microenvironment meeting (2022)
    - *Received Young Investigator Award*
6. Hasan H, Sohal IS, Soto-Vargas Z, Byappanhalli AM, Humphry SE, Kubo H, Kitdumrongthum S, Chairoungdua A, Kasinski AL. "A comprehensive comparative analysis of extracellular vesicle release in non-small cell lung cancer and its potential to drive cancer hallmarks in non-cancerous lung epithelial cells." ISEV2021 Virtual Annual Meeting (2021)
7. Sohal IS, Kasinski AL. "Unconventional exosome biogenesis pathway and its dysregulation in highly aggressive mesenchymal-like cancer cells." Purdue Biological Sciences Department Retreat (2019)
8. Sohal IS, Bello D. "Investigation of toxicity of a panel of food-grade nanomaterials on an in vitro triculture model of the mucus-secreting intestinal epithelium." TechConnect World Innovation Conference (2018)
9. Sohal IS, Bello D. "Revisiting the safety of food-grade nanomaterials: Towards more realistic and relevant studies." 4th Sustainable Nanotechnology Organization Conference – Presentation (2015)

Posters:

1. Lamptey EL, Harper HA, Olson MR, Elzey BD, Kasinski AL, Sohal IS. "A non-small cell lung cancer model to study human-specific extracellular vesicle-mediated T cell suppression *in vitro* and *in vivo*." UNT Health Research Appreciation Day (2026)

2. Sohal IS, Shaw SN, Meeks LN, Kasinski AL. “Golgi-derived extracellular vesicles lack conventional tetraspanins and mediate immune evasion in cancer.” American Association for Cancer Research (AACR) Annual Meeting (2025)
3. Mevaa IT, Abdelaal AM, Sohal IS, Iyer SG, Sudarshan K, Kothandaraman H, Lanman NA, Low PS, Kasinski AL. “Folate-mediated delivery of tumor-suppressive miRNA-34a to treat osteosarcoma.” American Association for Cancer Research (AACR) Annual Meeting (2025)
4. Waiker DK, Abdelaal AM, Iyer SG, Sohal IS, Orellana EA, Sudarshan K, Ozcan KE, Dos Santos AP, Low PS, Kasinski AL. “Ligand-directed delivery of chemically modified miR-34a to prostate cancer: enhanced targeting and extended pharmacokinetics.” American Association for Cancer Research (AACR) Annual Meeting (2025)
5. Soto-Vargas ZM, Arteaga DC, Sohal IS, Hasan H, Kasinski AL. “Impact of KRAS oncogenic signaling in tumorigenesis and immune evasion driven by extracellular vesicles (EVs).” American Association for Cancer Research (AACR) Annual Meeting (2023)
6. Sohal IS, Shaw SN, Kasinski AL. “Electron microscopy imaging using genetically-encoded APEX2 tag elucidates novel EV biogenesis in non-small cell lung cancer.” American Association for Cancer Research (AACR) Annual Meeting (2023)
7. Iyer SG, Abdelaal AM, Sohal IS, Kasireddy SR, Kasinski AL. “Targeting cancer cells using folate conjugated to a fully modified version of miR-34a (FolamiR-34a) to produce enhanced and sustained anti-tumor activity.” American Association for Cancer Research (AACR) Annual Meeting (2023)
8. Sohal IS, Shaw SN, Soto-Vargas Z, Kasinski AL. “Extracellular vesicles released from Golgi mediate immunosuppression in lung cancer” Purdue Cancer Research Day (2023)
9. Sohal IS, Shaw SN, Soto-Vargas Z, Kasinski AL. “The Golgi origin of extracellular vesicles and its role in cancer-T cell crosstalk in lung cancer” 8th Midwest Tumor Microenvironment Meeting (2023)
10. Sohal IS, Hasan H, Soto-Vargas Z, Kasinski AL. “Extracellular vesicles of highly metastatic lung cancer cells promote intravasation by disrupting epithelial barrier and inducing epithelial-to-mesenchymal plasticity in a 16-day mature bronchial epithelium.” 7th Annual Midwest Tumor Microenvironment meeting (2022)
11. Sohal IS, Abdelaal AM, Kasinski AL. “Determining the intracellular fate of ligand-conjugated therapeutics using nanogold labeling.” AACR Annual Meeting (2022)
    - *Received Purdue Postdoc Travel Grant*
12. Sohal IS, Soto-Vargas Z, Kasinski AL. “Extracellular vesicles from highly metastatic lung cancer cells induce barrier impairment, permeability, and epithelial-to-mesenchymal plasticity in a 16-day mature bronchial epithelium.” ISEV2020 Virtual Annual Meeting (2020)
13. Sohal IS, Soto-Vargas Z, Kasinski AL. “Lung cancer exosomes induce barrier impairment, permeability, and epithelial-to-mesenchymal transition in a 16-day mature bronchial epithelium.” ISEV-MRS Joint Conference on Extracellular Vesicles in Cancer (2019)
14. Sohal IS, Bello D. “Understanding behavior and dissolution kinetics of ingested ENMs in simulated digestive fluids.” TechConnect World Innovation Conference (2018)
15. Sohal IS, Bello D. “Reassessing toxicity of engineered food-grade nanomaterials in C2BBe1 and oral keratinocytes.” 8th International Nanotoxicology Congress (2016)

Grants Awarded

2025 – 2027 **R03 grant, National Cancer Institute** (About)
Title: Evaluate the role of extracellular vesicles in tumor microenvironment modulation
Role: Principal Investigator
$148.5K for 2 years (research)

2023 – 2024 **Postdoc Challenge Award, Indiana Clinical and Translational Sciences Institute** (About)
Title: Classification of human lung tumor specimens based on immune contexture
Role: Principal Investigator
$5,000 (research)

2021 – 2023 **Early Investigator Research Award, Department of Defense Prostate Cancer Research Program** (About)
Title: Ligand-Targeted miRNA Delivery for Prostate Cancer Therapy
Role: Principal Investigator
$460K for 2 years (research)

2019 – 2020 **Shared Resource Grant, Purdue University**
Title: Delineating novel exosome biogenesis pathways in lung cancer
Role: Principal Investigator
$2,500 (research)

Teaching at UNT

Graduate and undergraduate combined courses:

Spring 2026 Biochemistry & Molecular Biology of the Gene (BIOC/BIOL 4570 and BIOC/BIOL 5340), Enrollment – 65 (62 UG, 3 G)

Fall 2026 Molecular Biology of Cancer (BIOL 4005 and BIOL 5005)

Other Teaching Experience

2016 – 2018 Toxicology and Health (PUBH.5030) – Teaching Assistant
A graduate-level course offered every Fall semester (3 lectures per semester)

2014 – 2018 Life Science I (83.101) and Life Science II (83.102) – Teaching Instructor
Undergraduate-level courses offered every other semester (45 lectures/labs per semester). Enrollment – 100 students per semester.

Mentoring Experience at UNT

Mentoring undergraduate and graduate student at UNT in cancer biology research.

Current UNT students:

Name	Role	Period
Emmanuel L. Lamptey	Ph.D. student	2026 – current
Diya Patel	Undergraduate student	2025 – current
Tanvi Verma	Undergraduate student	2025 – current

Sanjana Munagala	TAMS student	2026 – current

Other Mentoring Experience:

2018 – 2025 Mentoring undergraduate and graduate students in the Kasinski Lab at Purdue University in extracellular vesicle biology and miRNA therapeutics research, designing hypothesis, bioinformatics analysis, animal work, feedback on research presentations, and scientific writing:

Name	Role	Period
Sydney Shaw	Undergraduate	2022 – 2024
Noor Abdullah	Undergraduate	2019 – 2021
Manvir Bains	Undergraduate	2018 – 2020
Antionette P. Yasko	Rotation student	2023
Jasleen Kaur	Ph.D. student (India)	2021 – 2022
Lauren Meeks	Ph.D. student	2024 – 2025
Sharjeel Anjum	Ph.D. student	2023 – 2025
Kenan Ozcan	Ph.D. student	2022 – 2025
Samira Piltan	Ph.D. student	2022 – 2025
Shreyas G. Iyer	Ph.D. student	2021 – 2025
Jihye (Julie) Son	Ph.D. student	2020 – 2025
Humna Hasan	Ph.D. student	2018 – 2024
Zulaida Soto-Vargas	Ph.D. student	2018 – 2023
Alejandra M. Agredo	Ph.D. student	2018 – 2023
Ahmed M. Abdelaal	Ph.D. student	2018 – 2023

2022 – 2023 Mentor at Lumiere Education, a global mentorship program that allows high school students from anywhere in the world work one-on-one with a Ph.D. mentor in a 10-week long intensive program to learn about the cutting-edge research in their field of interest and produce an independent research paper:

- Taha Lakhani, a student at Eastside Secondary School, Belleville, Ontario, Canada, worked with me from December 2022 – March 2023. I developed a personalized research program that was based on Taha's interest in Immunotherapy. We met on a weekly basis to develop a strong understanding of the lung immune system, mechanisms that allow lung cancers to evade immune response, and immunotherapy in lung cancer. Through his passion, and a little bit of my guidance, he wrote a detailed research paper titled "Introduction to Immunotherapy in Lung Cancer: A Review", summarizing his understanding of the field.
- Besufekad Liyew, a student at Wheaton High School, Wheaton, Maryland, worked with me from March 2023 – June 2023. Through extensive discussions and meetings on a weekly basis, Besu developed a comprehensive understanding of miRNA biogenesis, their mechanism of action, and their utilization as cancer therapeutics. He demonstrated his understanding of these concepts in a research paper titled "The mechanics of miRNA therapeutics and their effectiveness in combatting cancer development".

Service

To the Profession:

2025 – present **Associate Member** (American Association for Cancer Research)

2020 – present **Member** (International Society of Extracellular Vesicles)

2018 – present **Reviewer** (Peer-reviewed journals)

Scientific Reports
Nanotoxicology
Particle and Fibre Toxicology
Environmental Science: Nano
NanoImpact
ACS Nano
Environmental Science & Technology
Cell Biology & Toxicology

2024 – 2025 **Founding President** (Society of Research Fellows, Purdue Institute for Cancer Research)

I am the founding president of the Society of Research Fellows at the Purdue Institute for Cancer Research (PICR-SRF). The mission of PICR-SRF is to foster a sense of community among graduate students and postdocs at the Purdue Institute for Cancer Research and provide opportunities for personal and professional development.

2018 – present **Invited Talks and Other Contributions**

2026 Invited to be part of a Panel Discussion on "Life in academia, work-life balance, and your experience navigating all the challenges on the way to being a successful mentor and research scientist", UNT Biology Graduate Student Association

2024 Invited Talk at Postdoc Power Session, "How to find and apply for early-career fellowships", The Office for Postdoctoral Scholars, Purdue University

2024 Invited Talk, "Gaining external funding as a postdoc", Purdue Institute for Cancer Research

2024 Lab tour for Zeta Tau Alpha Women's Night of Hope event

Provided lab tours to undergraduate students and cancer survivors

2023 Lab tour for high school students

Coordinated lab visit for Purdue Polytechnic High School students, showcasing environment and dynamics of a cancer research lab

2022 Invited to be part of a Mentoring Panel to "Address student and faculty's questions and concerns about selecting the right mentor, work environment, ideology differences, and addressing conflicts", Purdue Biological Sciences Department Retreat

2022 Invited Talk, "A postdoc's guide to gaining external funding" Purdue Biochemistry Graduate Student Association

2022 Invited to Lead a Roundtable Discussion on "Overcoming Writer's Block to Get Your Inspiration and Creative Thinking Flowing", Purdue Biological Sciences Department Retreat

2021 Invited Talk, "A postdoc's guide to gaining external funding as a non-immigrant in the US" Purdue Cancer Research Day

2018 – 2020 Postdoc coordinator, Life Science Postdoc Initiative, Purdue University
Involved in coordinating meetings related to grant writing, funding, mentoring and other aspects of scientific training for postdocs at Purdue University