



Representative immunofluorescence image showing DNA damage in tamoxifen-resistant MCF7 breast cancer cells. Green fluorescence indicates S-phase labeling, red marks DNA damage, and blue represents the nucleus.

Picture credits: Shivani Choudhury

Integrated Cancer Genomics Lab's Lung Cancer Research Featured in The Indian Express

The Indian EXPRESS
JOURNALISM OF COURAGE

Why does lung cancer recur? It's all in the genes, finds new study

ANURADHA MASCARENHAS
PUNE, MARCH 17

EXPLAINED Tailored treatments way forward

A TEAM of Indian researchers has uncovered a genetic cause for the early relapse of a certain type of lung cancer in some patients, a discovery that can change the way the disease is treated.

Lung cancer is the leading cause of cancer deaths worldwide, mainly because it gets detected late. The discovery by the Indian researchers relates to lung adenocarcinoma, the most common type of lung cancer which often affects non-smokers as well.

Patients with this particular type of lung cancer carry a specific mutation in the Epidermal Growth Receptor Factor (EGFR) gene, and are treated with a class of targeted drugs called "EGFR tyrosine kinase inhibitors" that suppress the unusual growth of the cancerous cells.

But many patients eventually relapse owing to resistance to these therapies.

The Indian team, comprising researchers from the University of Delhi South Campus, Tata Memorial Centre in Mumbai and One Cell Diagnostics in Pune, has found that patients are more likely to experience a relapse when certain tumour suppressor genes (TSGs) undergo mutation alongside the EGFR gene. The study analysed data from 483 lung cancer patients with EGFR mutations, and found that patients who also had mutations in certain TSGs had significantly worse survival rates.

The researchers say their findings, published in the European Society of Medical Oncology Open, could help identify patients at higher risk of relapse and accordingly adjust their treatment.

"The average overall survival for patients with these additional mutations (TSGs) was 51.11 months, compared to 99.3 months for those without them. Similarly, the time before the cancer started progressing again — known as progression-free survival — was also shorter in patients with both types of mutations," said Anil Dutt, Professor and Tata Innovation Fellow, Integrated Cancer Genomic Laboratory, Department of Genetics, University of Delhi South Campus.

According to a global cancer statistics database compiled by the WHO, India recorded 83,748 new lung cancer cases and 75,231 deaths in 2022.

The study was supported by Science and Engineering Research

board, and Indian Council of Medical Research. It was led by Supriya Hait, a graduate student under the guidance of Prof. Dutt, and Dr Kumar Prabhash from Tata Memorial Centre in collaboration with Dr Jagant Khurade, Dr Gowhar Shafi and a team from One Cell Diagnostics.

Prof. Dutt said the researchers performed detailed genetic sequencing on tumour samples from 36 patients before and after their cancer relapsed to better understand how these genetic changes contribute to disease relapse. "A group of 17 TSGs that were frequently mutated in patients who relapsed early were identified. These genes were found to play a key role in driving resistance to EGFR-targeted treatments."

An important aspect of this study was its use of liquid biopsy — a blood test that detects cancer-related DNA fragments in the blood using a comprehensive genomic profiling panel developed by One Cell Diagnostics.

By analyzing 200 blood samples from 25 patients over time, the team was able to track how the genetic makeup of the tumours evolved during treatment. They found that in patients who relapsed early (within 10 months of starting treatment), mutations in these 17 TSGs were already present and became more dominant over time, suggesting that these mutations contribute to resistance from the start.

"If doctors can identify patients who have these additional tumour suppressor mutations early on, they may be able to take treatments more effectively," Prof. Dutt said.

The Indian EXPRESS Tue, 18 March 2025
<https://epaper.indianexpress.com/c/77>

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Why does lung cancer recur? It's all in the genes, finds new study

Lung cancer is the leading cause of cancer deaths worldwide, mainly because it gets detected late.



Left to right: Dr. Kumar Prabhash (Tata Memorial Centre, Mumbai), Prof. Amit Dutt (Dept of Genetics, Univ of Delhi South Campus), Dr. Gowhar Shafi (Photo Credit: One Cell Diagnostics, Pune)

Researchers from the Integrated Cancer Genomics Lab, led by Supriya Hait under Prof. Amit Dutt, have identified key genetic mutations driving early relapse in lung adenocarcinoma. Featured in The Indian Express on March 18, 2025, this study paves the way for personalized cancer treatments.

Prof. Amit Dutt at INTERONC 2025



Prof. Amit Dutt being felicitated at INTERONC 2025 for his contributions to cancer research.

Happy Birthday, Shivani!



Wishing Shivani a wonderful birthday
filled with joy and success!

Celebrating Shivani's Birthday!



Dutt lab members come together to celebrate Shivani's birthday with joy, laughter, pizza, and cake!

Visit from Lab Alumna!



Dr. Madhura Ketkar, a recent PhD graduate from Prof. Shilpee Dutt's lab, visited the School of Life Sciences (JNU) and the Integrated Cancer Genomics Lab (UDSC) to engage with researchers and discuss ongoing projects.

Insights and Inspirations :

Interview with Ornella Khwairakpam :

General Facts

1.Can you introduce yourself?

Hi, I am Ornella Khwairakpam. Currently, I am pursuing my postgraduate in M.Sc. Genetics from University of Delhi.



2.Can you share a brief overview of your educational background?

I have completed my studies till 12th standard at my hometown in Manipur. After which, I pursued B.Sc. (H) Botany at Miranda House, University of Delhi. Currently, I am in my final year for postgraduate in the Department of Genetics, University of Delhi, South Campus.

3.Where are you originally from, and where did you grow up?

I hail from the state of Manipur in the northeast region of India. I grew up in the island village of Thanga in the heart of Loktak lake, which is renowned as the largest freshwater lake in Northeast India.

4.What influenced your decision to pursue a career in genetics?

I have always been fascinated by science and particularly, understanding the intricacies of the biological systems. During my days at Miranda House, I developed a deep interest in the field of Genetics and Molecular Biology, which led me to further pursue my postgraduate in M.Sc. Genetics.

5.What are some lesser-known facts about you?

Lesser-known facts of me may include my admiration for the art of painting and sketching and that I am a foodie particularly for my local food. I have always had a profound pride in my cultural roots and upbringings, influenced by this I am always up to explore and learn about cultures and traditions of other regions, which people might not know, I guess.

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Personal Life

1.What are some of your hobbies and passions outside of science?

Outside of Science, I have interest in reading novels, watching movies and sketching.

2.As a child or teenager, what were your career aspirations, and what influenced those aspirations?

Career aspirations over time include first, becoming an oncologist, this was seeded to my mind when my aunt was diagnosed with cancer. Second, being a science enthusiast from a young age so scientist. And lastly, foreign ambassador or civil servant as I have been always intrigued by its service and responsibilities.

3.What has been the most exciting or challenging scientific question you have explored so far?

The most exciting scientific question I have explored so far would be the question of the role of p53 biology in metabolism of hyaluronic acid pathway in oral cancer. I came across this question during my dissertation for M.Sc. where TP 53 R248Q, a hotspot mutation is targeted in the metabolic pathway of UDP-glucose 6-dehydrogenase (UGDH) pathway which was significantly altered in SCC9 cell line (HNSCC).

4.How has your perspective on science and research evolved over time?

Through my journey in science and research, I have developed keen interest in fields such as Molecular Biology, Genetics and Cancer biology. I worked as a research intern during my college days at Manipur University, Imphal on a project entitled “An Evaluation of Anticancer Potential of Secreted Polysaccharides from *Schizophyllum commune*” which focused on isolation of polysaccharides and analysing their anti-cancer property of on HeLa Cells. This greatly influenced interest in Cancer Biology. Right now, I am further exploring the research culture in Cancer Genomics wet lab under Dr. Amit Dutt.

5.If you could contribute one significant discovery to your field, what would it be?

Every experiment has its own significance. In this context, one contribution that could be significant in my field would be the topic of my dissertation. The work is focused on identifying DNA repair mechanism defect in endocrine therapy resistant breast cancer cells.

6.Can you share an important life lesson or philosophy that guides you?

One philosophy that I believe is that “the only thing that doesn’t change is change”. This inspires me to adapt myself to any situation in life and that I can keep learning and change myself to become the person I envision myself to be.

7.Is there a particular person or event that has greatly influenced you?

I believe in learning bits of something that I admire from every person. In life we are a mosaic of everyone we have ever loved. There are people in my life that I greatly admire and their working ethics, say my parents.

8.If you could spend a day entirely to yourself, how would you spend it?

If I could spend a day entirely to myself, I would like spend it with my family and closed ones, be it either at home or going out to eat and enjoying a calm evening. This would give me a much-needed break and recharge my energy.

Science and Research

1.How would you define research? What does it mean to you personally?

To me research is the journey of chasing passion and quenching curiosity through experimentations to enable gathering of in-depth knowledge in a particular field and to attain sustainable practical solutions to certain challenges. It is exposure to diverse groups of researchers to share skills and form connections to work towards solving the problem.

2.What keeps you motivated to pursue your master's in genetics, especially when challenges arise?

When challenge arise through my journey, I talk to my friends and seniors who could me guide me to get through the issue. My motivation to pursue my masters in genetics even through challenges comes from my deep-rooted interest in learning molecular human genetics and its related applications in fields such as Cancer.

3.What has been the most exciting or challenging scientific question you have explored so far?

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