

PLUMBING THE 'DARK' GENOME FOR NEW GENES

Relevant for: Science & Technology | Topic: Biotechnology, Genetics & Health related developments

New revelation: Mutations in the novel regions do have physiological consequences, says Sudhakaran Prabakaran. | Photo Credit: [Rasi Bhadramani](#)

On June 26, 2000, former U.S. President, Bill Clinton, announced the completion of a draft sequence of the human genome, a historic landmark for genetic research. The Human Genome Project helped map our genes, strengthened the study of human diseases and aided new drug discovery. But even after two decades, the number of 'known' genes – encoding around 20,000 'known' proteins - has remained constant. It is also a conundrum why only 1.5% of the entire human genome codes for proteins.

A team from the University of Cambridge set out to find whether new genes emerge in the genome of living organisms, and if they do, how they do so.

In the last seven years, the team extensively studied the human genome and has now catalogued 1,94,000 novel regions. The results were published in *Genome Research*.

“These ‘novel’ genomic regions cannot be defined by our current ‘definition’ of a gene. Hence, we call these novel regions – novel Open Reading Frames or as nORFs. We show that the mutations in nORFs do have physiological consequences and a majority of mutations that are often annotated as benign have to be re-interpreted,” explains lead author Sudhakaran Prabakaran from the Laboratory of Noncoding genome and Data Science at the University.

When asked why we weren't able to see or find these regions earlier, he added that in the last 10 years new technologies have helped look at the entire gene better. “For example, if you were to look at a mountain range from the top, you will only see the peaks. But as the resolution of the technology improves, you will see things that are present in the lower peaks and you can see the valleys. So, new genomic and proteomic technologies, algorithms have enabled us to see the complete landscape of everything that is being made from the human genome,” he explains.

The team found that these regions are also broadly involved in diseases. The nORFs were seen as dysregulated in 22 cancer types. Dysregulated is a term which means that they could either be mutated, upregulated, or downregulated, or they could be uniquely present.

A paper published last month by the team in *npj Genomic Medicine* noted that these regions were uniquely present in the cancer tissues and not present in the control tissue. They found that some nORF disruptions strongly correlated with the survival of patients. “More importantly, we show that nORFs proteins can form structures, can undergo biochemical regulation like known proteins and be targeted by drugs in case they are disrupted in diseases,” adds Dr. Prabakaran.

The researchers also identified these nORFs in *Plasmodium falciparum*, the parasite which causes the deadliest form of malaria. The results were published last week in *Malaria Journal*.

This shows that there is an urgent need to redesign our existing drugs that target only the known proteins in the parasite.

The team is now systematically ‘mining’ the dark genome to identify more such novel proteins and investigating whether they could be involved in disease processes. They have also

identified 50 such novel proteins disrupted in schizophrenia and bipolar disorder. The results are yet to be peer-reviewed and published. The researchers are positive that these novel proteins are the key to diagnosing and treating complex diseases.

This story is available exclusively to The Hindu subscribers only.

Already have an account ? [Sign in](#)

Start your 14 days free trial. [Sign Up](#)

Find mobile-friendly version of articles from the day's newspaper in one easy-to-read list.

Enjoy reading as many articles as you wish without any limitations.

A select list of articles that match your interests and tastes.

Move smoothly between articles as our pages load instantly.

A one-stop-shop for seeing the latest updates, and managing your preferences.

We brief you on the latest and most important developments, three times a day.

*Our Digital Subscription plans do not currently include the e-paper, crossword and print.

Dear reader,

We have been keeping you up-to-date with information on the developments in India and the world that have a bearing on our health and wellbeing, our lives and livelihoods, during these difficult times. To enable wide dissemination of news that is in public interest, we have increased the number of articles that can be read free, and extended free trial periods. However, we have a request for those who can afford to subscribe: please do. As we fight disinformation and misinformation, and keep apace with the happenings, we need to commit greater resources to news gathering operations. We promise to deliver quality journalism that stays away from vested interest and political propaganda.

Dear subscriber,

Thank you!

Your support for our journalism is invaluable. It's a support for truth and fairness in journalism. It has helped us keep apace with events and happenings.

The Hindu has always stood for journalism that is in the public interest. At this difficult time, it becomes even more important that we have access to information that has a bearing on our health and well-being, our lives, and livelihoods. As a subscriber, you are not only a beneficiary of our work but also its enabler.

We also reiterate here the promise that our team of reporters, copy editors, fact-checkers, designers, and photographers will deliver quality journalism that stays away from vested interest and political propaganda.

Suresh Nambath

Please enter a valid email address.

The UAE has planned to build a human settlement on Mars by 2117

You can support quality journalism by turning off ad blocker or purchase a subscription for unlimited access to The Hindu.

[Sign up for a 30 day free trial.](#)

END

Downloaded from **crackIAS.com**

© **Zuccess App** by crackIAS.com

CrackIAS.com