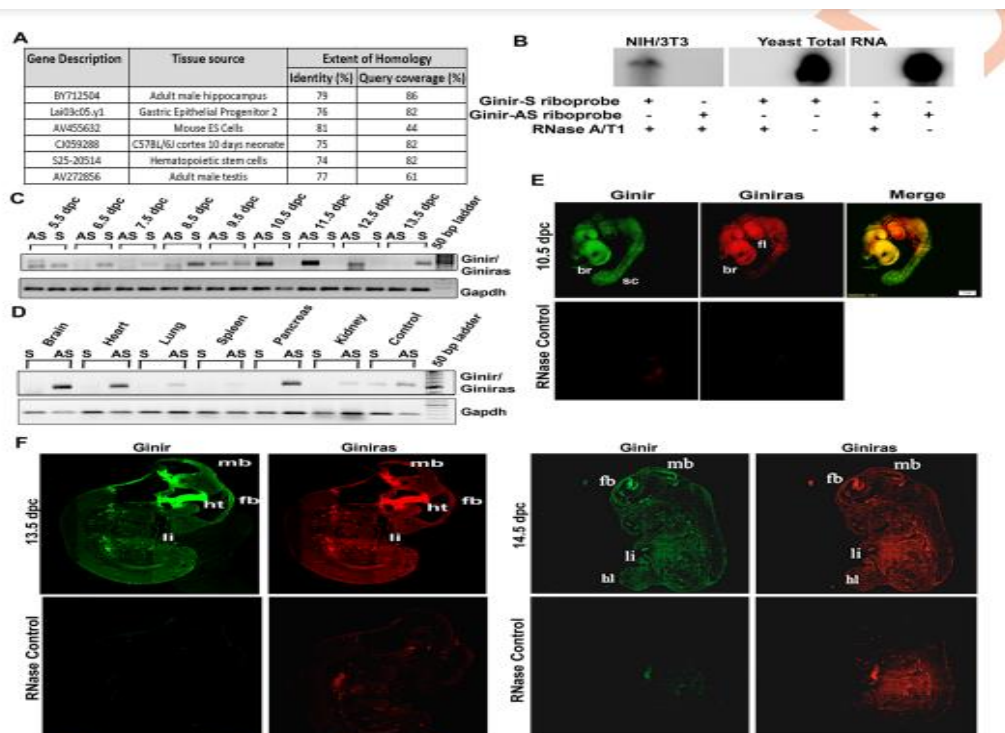


An unexpected cellular molecule found to play a role in cancers

The long-held belief that oncoproteins are mainly responsible for the development of cancer, has now been challenged by novel research findings of a long-standing study by a team led by Dr. Anjali Shiras, a scientist at the National Centre for Cell Science (DBT-NCCS), Pune, and Dr. L.C. Padhy at Kalinga Institute of Industrial Technology (KIIT), Bhubaneswar, formerly a scientist at the Tata Institute of Fundamental Research (TIFR), Mumbai. The teams diligently pursued the non-conventional idea that RNAs that are transcribed from DNA, but are not subsequently translated to proteins (i.e. non-coding RNAs), may also hold clues to de-regulating cell growth balance, thus leading to abnormal cell growth. Concerted and persistent efforts by Dr. Shiras' team over more than a decade have now succeeded in establishing that a non-coding RNA identified at NCCS, which they have named as 'Ginir', acts like a cancer-causing oncogene. The research findings, which highlight that Ginir plays a role in the development of cancer, were published in the premier international journal, *PLoS Biology*. This work was ably supported by a dedicated team from NCCS, who were involved in studying Ginir, and determining its cancer-causing role.



The process of tumor development is studied using various model systems that mimic the processes occurring inside the human body. Investigations carried out by Dr. Shiras' team used

mouse cells as an experimental model system, led to the unprecedented discovery of and demonstration of the cancer-causing role of Ginir. Their studies also led to the identification of a hitherto unreported role of the centrosomal protein, Cep112, as an interacting protein partner for Ginir. Team has further shown that a disturbance in this interaction leads to abnormal cell growth. With such a mechanism of action being the first of its kind reported for any non-coding RNA, these research findings have attracted international acclaim from other leading research groups.

This study changes our understanding of how cancer occurs, and opens a Pandora's Box, encouraging researchers to look outside the classical concepts of oncogenesis (development of cancer). Owing to their unconventional nature, these findings were initially met with skepticism. However, the perseverance of the team backed by support from NCCS, lead to this strikingly novel discovery that non-coding RNA can also be an important player in cancer.

Dr. Shiras' team continues to work on understanding the mechanisms responsible for the regulation of expression of the Ginir RNA in the cells. They are also working towards gaining insights into how controlled and balanced expression of Ginir could keep the growth of cells in check, thus preventing their uncontrolled growth and multiplication. The insights gained from these studies could help design improved methods for the detection, management and treatment of cancer.

Cancer is one of the most dreaded diseases the world over. Thanks to the ongoing efforts of scientists, many genes responsible for uncontrolled cell growth, the hallmark of cancer, are now known and well-studied. These genes, which increase the propensity towards developing cancer, are called oncogenes. Any molecules that could nullify the action of oncogenes would ideally be effective in inhibiting the uncontrolled growth of cancer cells, and thereby help eliminate the tumor. Most of the oncogenes identified to date fall into the category of genes that exert their influence by being translated into biomolecules known as proteins, specifically called oncoproteins, via an intermediate molecule called RNA. Therefore, most research carried out so far has been focused on studying these oncoproteins.

Link: <https://journals.plos.org/plosbiology/article/authors?id=10.1371/journal.pbio.2004204>

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