Cells May Show Signs of Mutating Years Before Cancer Diagnosis

This finding could lead to very early cancer interventions.

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An investigation of the genetic mutations that cause healthy cells to give rise to cancer has found that early signs of such malignant mutations may appear years or even decades prior to a cancer diagnosis, The Guardian reports.

This finding from investigators at the Pan-Cancer Analysis of Whole Genomes project, a far-reaching analysis of cancer genetics, could lead to new interventions that could nip cancer at stages much earlier than previously thought possible.

Publishing their findings in the journal Nature, a research team led by Clemency Jolly and Peter Van Loo, PhD, of the Francis Crick Institute in London, sequenced the entire genomes of nearly 2,700 tumor samples and mapped mutations in the genetic code of 38 different cancer types.

The investigators found that half of the earliest mutations that led to cancer took place in only nine genes. Such mutations could possibly be identified through liquid biopsies, which detect DNA mutations in the blood and can indicate the presence of tumors within the body.

Of the billions of mutations that human cells may undergo a select sample are called driver mutations, which lead to cancer. Considering this, the study authors assessed how many times a driver mutation was replicated and copied across chromosomes.

Then they used a carbon-dating method to determine the sequence by which cancer cells accumulated genetic errors until the point that large portions of their genomes had been mixed up and copied.

Such mutations occurred especially early for ovarian cancer and two brain tumor types, glioblastoma and medulloblastoma.

“Timing analyses suggest that driver mutations often precede diagnosis by many years, if not decades,” the study authors concluded. “Together, these results determine the evolutionary trajectories of cancer and highlight opportunities for early cancer detection.”

To read the Guardian article, click here.

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