The Key Role Of Stem Cells In Lethal Gastric Cancer Revealed

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In a recent study published in Nature Communications, scientists from Cornell University made new findings in common and fatal gastric cancer research. In the United States, the incidence of gastroesophageal cancer increased 2.5-fold from the 1970s to the early 2000s, however, from the 1950s, the number of all patients with gastric cancer decreased by more than 80%; despite this, gastric cancer is still the fifth most common cancer and the third leading cause of cancer death worldwide.

In this study, the researchers identified a novel pathway in gastroesophageal cancer that may be expected to serve as a potential target to help develop novel therapies; a type of stem cell offspring called Lgr5 + may gather in large numbers, thereby promoting the development of cancer at the encounter between the two gastric tissues. Professor Alexander Nikitin, a researcher, said that at the global level, gastric squamous columnar junction cancer (gastroesophageal cancer) is a frequent disease and the prognosis of patients is poor, so it is essential to study the mechanism of this type of cancer formation and how it is treated.

In this study, the researchers developed experimental mouse models carrying two tumor suppressor genes that can become inactivated under specific conditions, a model that meets a number of parameters necessary to perform accurate studies of cancer, and previous researchers have certain limitations in mouse studies, that is, mice golden glow produce specific types of tumors or premature death, which undoubtedly inhibits the conduct of the study, but in this study, the mouse model developed by the researchers was able to develop a related form of metastatic gastric columnar junction cancer.

Previously, researchers have found that Lgr5 + stem cells are involved in many types of cancer, said researcher Nikitin. This study suggests that this may not necessarily be applicable to all types of cancer, but there is no evidence that Lgr5 + stem cells themselves induce gastric columnar junction cancer. In this study, through the study of mouse models and organoids, the researchers found that a large number of offspring called Lgr5-CD44 + cells (not Lgr5 + stem cells) accumulate at junctions, and when stem cells undergo classification, they differentiate into specialized cells. But early in division, these cells are not mature, and they have not yet differentiated, and the researchers can detect the presence of these offspring cells in the earliest identifiable lesions and advanced cancers. And after using organoids for research, the researchers found that these cells can be easily transformed.

The results suggest that the cancer-prone characteristics of other transition zones may also be due to the presence of a large number of immature cells, and the researchers also revealed a special protein called osteopontin, which can bind to the receptor of CD44 + cells and turn on a series of downstream effects; the osteoponti –CD44 + complex can control the balance between stem cells and differentiated cells, and produce more stem cells and cells with stem cell characteristics, such as Lgr5-CD44 + cells.

The presence of osteopontin signaling can maintain cells in an immature state, which may be one of the key mechanisms that can help explain why the body has a large pool of immature cells (Lgr5-CD44 + cells), the researchers said. The researchers studied two groups of human patients and found that the results were consistent with those obtained from studies in mouse models, that is, low levels of osteopontin and CD44 cells were directly associated with higher survival status of patients, while late overexpression was directly associated with poorer prognosis in human gastric scale-columnar junction cancer patients.

Later, researchers need to conduct more in-depth studies to investigate and analyze whether osteopontin inhibitors and CD44 + cell antibodies can be used to inhibit the accumulation of Lgr5-CD44 + cells, so as to better treat cancer.