Transforming Cancer Cells into Normal Cells

On December 20, 2024, the research team from KAIST University announced an important breakthrough regarding cancer treatment The scientists invented a technique that converts dangerous cancer cells back to regular cells even though also safely treating the body. This method allows them to avoid the risks associated with processes like chemotherapy.

But what makes this new technology stand out?

The majority of cancer treatment revolves around the idea of killing cancer cells; thus, selecting for chemotherapy and seeking out other methods which contain potent substances. Unlike other approaches, this novel method seeks to restore healthy characteristics to cancerous cells, therefore it does not inflict any destruction onto the cells.

What is the technique behind this technology?

“Transforming Cancer Cells into Normal Cells” may sound strange, but there is insightful science that backs it up. Now, let us look at the reasoning behind it:

Every cell in our body has a specific job whether a skin cell, blood cell, or muscle cell. This is named as cellular differentiation - the stage where cells evolve into their selected types. The process is managed by genes which can “turn on” or “turn off” certain functions.

But switching genes on or off is not easy. Scientists have faced challenges when trying to understand the particular causes of changes, as far as cancer cells are concerned. The distinction of cancer cells is that they remain uncontrolled because the regulation of genes is abnormal, so they grow indefinitely and act in adverse ways.

The Discovery of Master Regulators

The team at KAIST wanted to understand what causes such regulation and in the process found out this thing called master regulators, which are known to be as the referential genes in charge of saying whether cells function normally or transform into cancer ones.

For this, they have used their technology, which is known as BENEIN. Using it, they built an artificial gene model of network in a normal cell and in the process identified three crucial master regulators: MYB, HDAC2, and FOXA2. These regulators determine which cells differentiate into the various types and more importantly, which ones remain functional and healthy.

They observed that when these regulators were turned off in colorectal cancer cells, the cancer cells started to behave like normal cells.

Validating the Findings

Of course, simply observing in the lab was not sufficient to confirm their discovery. The group took their work a step further by trying the approach in vitro and in vivo. These extra tests confirmed their method, making this discovery even more optimistic.

CONCLUSION

This research may change cancer treatment by reversing the properties of cancer cells without killing them. This may eventually result in safer, more focused, and more successful cancer treatments, improving patients' quality of life without the adverse effects of traditional treatment.

REFERENCE

1. Control of Cellular Differentiation Trajectories for Cancer Reversion
2. KAIST Develops Foundational Technology to Revert Cancer Cells to Normal Cells