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Single-Cell RNA Sequencing and Acute Coronary Syndrome

A research group from Kobe University Graduate School of Medicine's Division of Cardiovascular Medicine in the Department of Internal Medicine has identified the characteristics of myeloid immune cells in coronary plaque, which causes acute coronary syndrome, through single-cell RNA sequencing, The goal is to use this data to develop a treatment method that could potentially stabilise coronary plaque. The findings are published in *Circulation.*

The researchers identified the characteristics of coronary plaques that cause acute heart attacks through single-cell RNA sequencing. They reveal that more monocytes, mast cells and inflammatory macrophages accumulated in coronary plaques involved in acute coronary syndrome in comparison to culprit plaques for chronic coronary syndrome.

Over the years, there has been significant advancement in analytical techniques. One such technique is single-cell RNA sequencing, which enables the gene expression of each individual cell to be comprehensively analysed. Single-cell RNA sequencing has been carried out on the plaque that causes arteriosclerosis. However, to date, no studies have been conducted on carotid plaque.

The formation of artery-hardening plaque is strongly linked to inflammation. However, it is still unclear what kind of immune cells are found in the carotid plaque and what characteristics do these cells have. It also remains to be seen how carotid plaque acts at the onset of acute coronary syndrome.

For the purpose of this study, the researchers obtained samples by conducting directional coronary atherectomy procedures on patients at Hyogo Brain and Heart Center. Single-cell RNA sequencing was carried out on samples from four cases of chronic coronary syndrome and three cases of acute coronary syndrome. The results revealed the presence of macrophages (three types), monocytes, mast cells and dendritic cell clusters. A comparison of the results for the chronic cases with those of acute cases revealed that more monocytes, mast cells and inflammatory macrophages accumulated in the coronary plaques in acute coronary syndrome cases

This is the first study to reveal the distinct characteristics of myeloid immune cells in the coronary plaque of patients with acute coronary syndrome. The researchers now plan to to use this data to develop a treatment method that can stabilise coronary plaque.

Source: Kobe University

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