14 Protein Signature – Early Lung Cancer Prediction

Prelims: *Current events of national and international importance | Health*

Why in News?

Recently, Scientists find a blood test that predicts lung cancer years early.

- **Discovery –** A multinational team led by *Charles Swanton* (Francis Crick Institute, London) published a study in Cell, identifying a 14-protein blood plasma signature.
- **14-protein signature –** It is a groundbreaking blood-based risk test *(Liquid Biopsy)* that detects subtle, cancer-promoting inflammatory changes in the blood plasma.
- **Plasma Proteomics** – Blood plasma contains thousands of proteins from all organs; the set of proteins is called the plasma proteome and the systematic study is called proteomics.
- **Liquid Biopsy –** Non-invasive; doctors take a blood plasma sample, which carries protein signals from all organs.

Traditional Biopsy – *Invasive; doctors cut or insert a needle into the lung to test tissue.*

Mechanism

- Blood plasma acts like a river carrying protein "messages" from organs.
- **Variation –** Healthy organs release normal proteins; diseased organs release abnormal ones and blood sample gives a real-time snapshot of these proteins.
- **Data Source –** The team used data from 48,000 volunteers in the U.K. Biobank, then applied AI/machine learning to compare healthy vs lung cancer cases.
- **Discovery –** Found a specific pattern of 14 proteins in the blood.
- **Early warning –** 14-protein signature in blood plasma acts as an early warning, predicting lung cancer years before tumours appear on scans.

- **Research findings –** In most cases smoking and air pollution caused inflammation, that awakens dormant mutant lung cells, which eventually become cancer cells.

CANTOS (Canakinumab Anti-inflammatory Thrombosis Outcome Study) Trial

- A major medical research study designed to test a new way of preventing heart attacks.
- **The Original Purpose –** To prevent heart attacks by lowering a patient's cholesterol.
- However, the CANTOS trial aimed to test *whether reducing inflammation could lower the risk of heart attacks.*
- **Retrospective Analysis –** Scientists re-examined the trial data and found that among 2,300 participants with the 14-protein signature, those given canakinumab had 50% lower risk of lung cancer.
- **Implication –** Canakinumab could potentially prevent lung cancer in people showing the 14-protein signature.
- **Latent issue –** Canakinumab has some severe, toxic side effects and is incredibly expensive, therefore scientists are using the lessons of CANTOS trial to look for other alternative options.

Reference

The Hindu | 14 Protein Signature

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