

1. Role of Glucose in Regulating Liver Functions

Prelims Syllabus: Science and Technology – Newer Inventions.

Mains Syllabus: GS-III Achievements of Indians in Science & Technology; indigenization of Technology and developing New Technology.

Why in News?

- The recent study by researchers from the Tata Institute of Fundamental Research, Mumbai (TIFR) has revealed that glucose in the body controls the function of SIRT1 directly.

What is SIRT1?

- SIRT1 is an enzyme that de-acetylates (removal of acetyl) proteins and contribute to cellular regulation (reaction to stressors, longevity).

Functions:

- In normal healthy individuals, SIRT1 protein levels are known to increase during fasting and decrease during the feed, which is essential to maintain a balance between glucose and fat metabolism.
- The glucose controls the functions of a protein SIRT1 which in turn maintains everyday feed-fast cycles and is also associated with longevity.
- The feed-fast cycle is a basic pattern and the metabolism-related to this is largely taken care of by the liver.
- Thus, the study shows that both over-activation and under-activation of SIRT1 can lead to diseases. Glucose puts a check on the activity of SIRT1 in the fed state. In the absence of this check, SIRT1 activity increases and results in hyperglycemia in a fasted state, mimicking diabetic state.
- The constant feeding or high-calorie intake that leads to a sustained reduction in the levels of SIRT1 (by glucose) is associated with ageing and obesity.

Significance of the Study:

- A shortage or absence of the control of SIRT1 by glucose may lead to a diabetic-like state, while excess feeding and sustained low levels of SIRT1 can lead to obesity and enhanced ageing.
- This study paves the way might be beneficial in tackling lifestyle disorders and ageing-Related Diseases.