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Free Radicals May Not Be All Bad

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Free radicals are hyper reactive molecules that are implicated in a range of diseases ranging from cancers to neurodegenerative disorders to cardiovascular complications.

Why in News?

A team of researchers from the Indian Institute of Science Education and Research (IISER), Mohali, has found that these unstable and highly reactive molecules may be vital in regulating growth and the size of organisms.

What are Free Radicals?

- Free radicals are molecules that react readily with other substances in the body, and this can have negative effects on health in certain circumstances, through the damage caused to cells.
- Free radicals can be counteracted by substances known as '**antioxidants**', which are common ingredients in many dietary supplements.
- As the body ages, it loses its ability to fight the effects of free radicals. The result is more free radicals, more oxidative stress, and more damage to cells, which leads to **degenerative processes**, as well as "**normal**" aging.
- Various studies and theories have connected oxidative stress due to free radicals to:
 - central nervous system diseases, such as Alzheimer's and other dementias
 - cardiovascular disease due to clogged arteries
 - autoimmune and inflammatory disorders, such as rheumatoid arthritis and cancer
 - cataracts and age-related vision decline
 - age-related changes in appearance, such as loss of skin elasticity, wrinkles, greying hair, hair loss, and changes in hair texture
 - diabetes
 - genetic degenerative diseases, such as Huntington's disease or Parkinson's

What has New Study Found?

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- Study by IISER has shown that free radicals are also used by an organism to **modulate its systemic growth**.
 - The study is significant because it throws light on the **interplay between certain vital biological processes** during the early stages of life.
 - Another study has also shown that, when the body is subject to different types of stress, the sympathetic nervous system stimulates receptors known as beta-adrenergic receptors on the surface of heart muscle cells. This leads to several changes inside the cells, one of which is the phosphorylation of proteins. This leads to the contraction of the cells becoming stronger and the heart beats with greater force. In this process the role of free radical gains further importance, since they contribute to the heart being able to pump more blood in stress-filled situations.