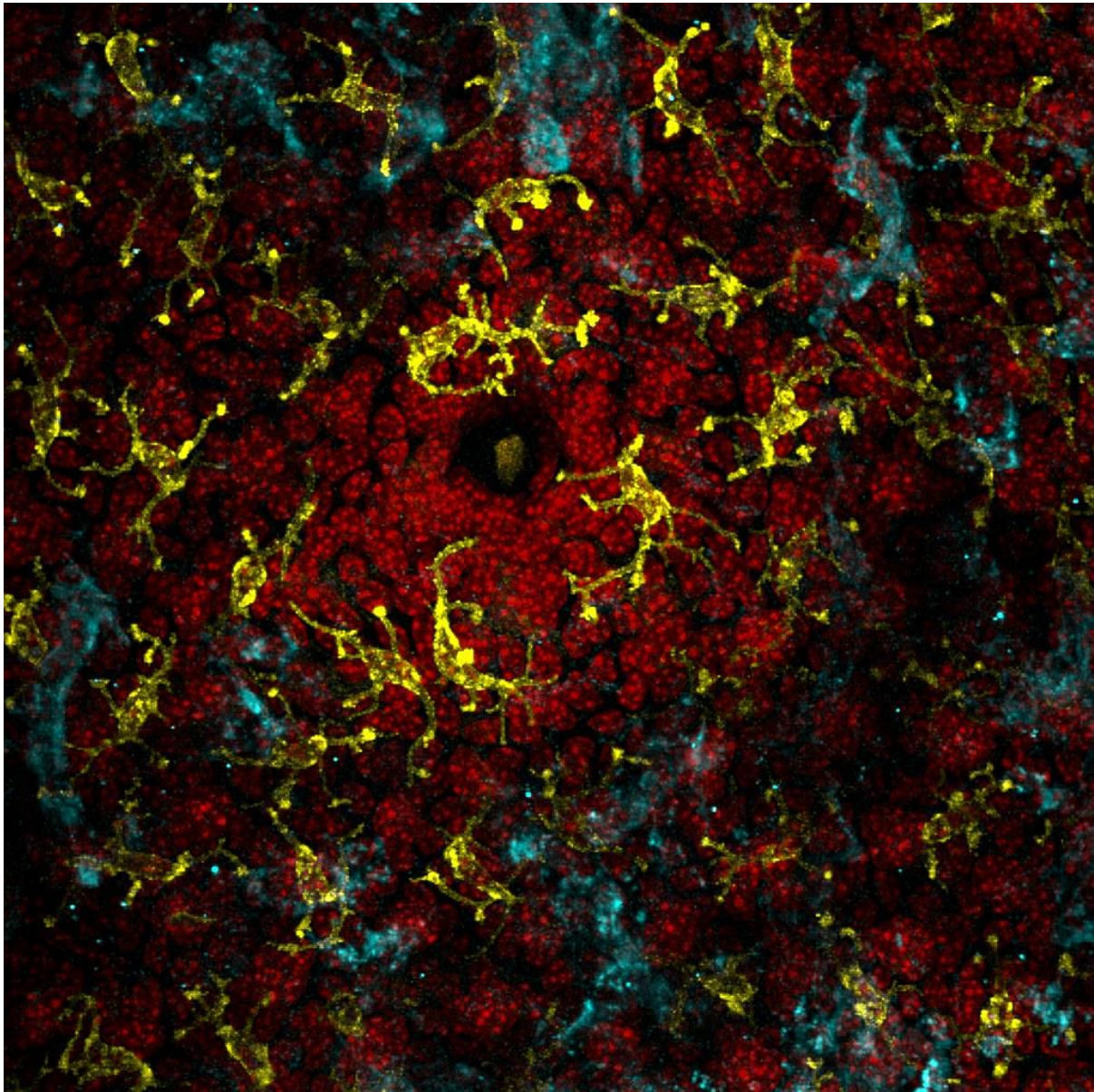


## DBT-inStem scientists decipher role of immune cells in growth of animals

New Delhi, Aug 14: Studies over the years have described the systemic control of signals emanating from tissues like the brain, thyroid and liver on the growth of animals. A large body of research implicates the brain and body fat (liver equivalent) as central players in coordinating growth and nutritional balance in multicellular animals. An underlying connection between immune cells and growth is also evident, although a detailed understanding of this cross-talk is scarce.



A recent study by Tina Mukherjee and her group at the Metabolism and Development (MAD) lab at the Department of Biotechnology's Institute for Stem Cell Science & Regenerative Medicine (DBT-inStem) has deciphered the role of innate immune cells in animal growth both during normal times and in conditions of nutrient stress.

The study, which was conducted on fruit fly (*Drosophila melanogaster*) found that the larvae of the insect that was lacking in blood cells produced smaller adults with signs of insulin

insensitivity. Moreover, when they were exposed to a high-sucrose diet (HSD), the adults were further growth retarded than normally seen in regular animals raised on HSD.

In contrast, larvae that carried an increased number of activated macrophage-like plasmatocytes showed no defects in adult growth when raised on HSD and grew to sizes almost comparable with that seen with regular diet.

These observations implied that there was a central role for immune cell activity in growth control. Mechanistically, the findings reveal that immune cells had an influence on the balancing of fat body inflammation and insulin signaling both normally and under conditions of nutrient overload as a means to coordinate systemic metabolism and adult growth.

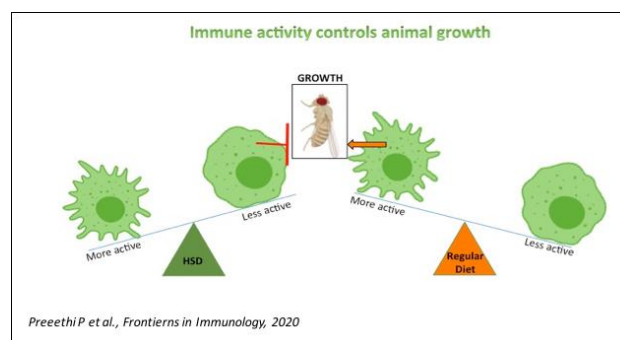
The immune system of *Drosophila* is akin to the mammalian innate immune system, which refers to the non-specific defense mechanism in the body and is the primary response initiated immediately upon invasion with a foreign pathogen. This work reveals how interactions between cells of the immune system (cellular arm) and material released by cells (secretory or humoral component) can influence animal growth.

The study assumes importance as animal development and growth is reliant on proper nutrition and metabolism. Organs coordinating metabolism therefore play a central role in growth control. Growth failure is a commonly observed problem when there are any alterations in metabolic condition as seen early in childhood cases with diabetes.

Thus, much of the focus in the field of growth and metabolism has always been centered around organs like thyroid, liver, and brain to name a few. The new investigation shows immune cells as an important component of nutritional control, systemic metabolism, and animal growth eventually. It further highlights immune cell state and functions as a central component of organismal growth.

The findings from this work and on-going research by the scientists is expected to provide a deeper understanding on the nature of this cross talk initiated by immune cells and reveal novel mechanistic insights of underlying developmental paradigms operating in animal growth that may be broadly conserved across mammalian systems as well.

A research paper on the work has been published recently in *Frontiers in Immunology* Journal (July 2020) titled '*Immune Control of Animal Growth in Homeostasis and Nutritional Stress in Drosophila*'. An article on this has also been posted on DBT-inStem's [website](#).



### Reference:

Preethi P, Tomar A., Madhwal S., Mukherjee T. (2020) Immune control of animal growth in homeostasis and nutritional stress in *Drosophila*. *Frontiers in Immunology*. (Published on July 31, 2020)

Link: <https://instem.res.in/>