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PHARMA HIGHLIGHTS

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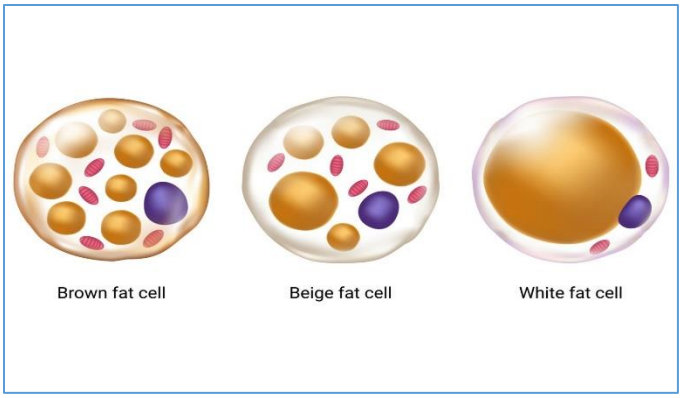
Brown Fat Appears to Protect Against Disease



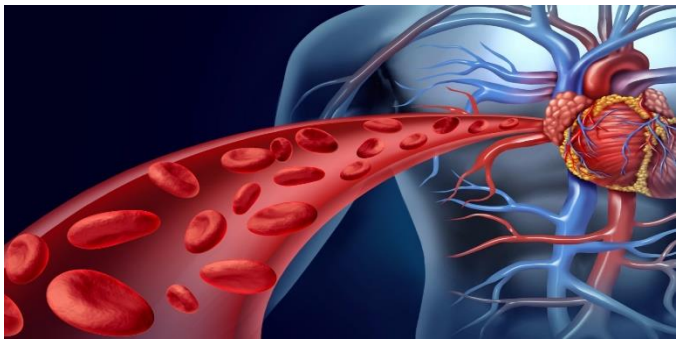
White fat is what we're usually thinking of when we think of flabby tissue that stores excess calories, but brown fat is very different. Brown fat can burn energy, and some have suggested that people with more brown fat are healthier than those with less. But brown fat is typically situated deep within the body, making these assertions difficult to prove. Reporting in Nature Medicine, scientists have now been able to do just that.

In this study, researchers were able to assess over 130,000 PET scans from 52,000 individuals to show that people with lots of brown fat are also healthier. Data from PET scans are tough to find because they not typically used, making this the largest study of its kind. About ten percent of the PET scans they analyzed revealed brown fat. The work showed that people with detectable levels of brown fat were less likely than those that did not to have metabolic and cardiac diseases like type 2 diabetes or coronary artery disease. Cohen noted that since these patients had been counseled to avoid things that can raise brown fat levels like exercise and cold exposure, some of their levels may have been low.

In those with detectable brown fat levels, there was slight reduction in the prevalence of abnormal cholesterol – 18.9 percent of those with brown fat had abnormal cholesterol levels while 22.2 percent of people lacking brown fat had poor levels. People with brown fat were found to be less likely to develop congestive heart failure, coronary artery disease, or hypertension. Brown fat might help alleviate the adverse effects of obesity since the study showed that obese people with brown fat had risk factors that were similar to those of normal weight. More work will be needed to understand the physiology underlying these observations. The researchers are planning to continue to investigate brown fat biology and are interested in whether genetics predisposes people to have more or less of it..

Written by: Nashrah Mustafa

Controlling Tumor Blood Flow to Increase Therapy Effectiveness



As of now, the most common way to get a drug to a tumor is to target a protein that the tumors are overexpressing, or relying on a tumor's general high resource demand. The drug would then be injected into the patient, and circulate through the bloodstream until it reaches the tumor. In the case of melanoma, there may be a better way of targeting therapies to tumors.

In-transit melanoma is a rare and dangerous type of skin cancer. There are chemo- and immunotherapies that could treat it, but a team from the Mayo Clinic in Florida wanted to try another route. They intended to develop a modern method called isolated limb infusion, but results were not consistent. The team redeveloped the method by effectively controlling the flow of blood in a tumor. They note that tumors often have non-functioning or closed blood vessels, which, if opened, may allow a drug to have increased exposure to the tumor itself. They developed a protocol of injecting saline bolus (a salt solution) followed by two phenylephrine (a vasoconstrictor) injections. The saline bolus would initiate a significant increase in blood flow through the tumor vasculature, while the phenylephrine would slow the blood flow afterward. They termed this dynamic control. The team tested their method in a melanoma mouse model. The mice were treated with a negative control, dynamic control alone, the drug melphalan alone, or a combination of dynamic control and melphalan. The combination therapy had the best results, significantly outcompeting melphalan alone. Dynamic control was surprisingly better than the negative control used, although still nowhere near as effective as melphalan or combination therapy.

Written by: Nuzhat Zahin

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Some Microbes Could Help Treat Type 2 Diabetes

In diabetes, the body stops producing insulin or stops responding to the effects of it. Regardless of the physiology underlying the disease, the end result is that excess sugar builds up in the blood, which can eventually damage organs and could be life-threatening. Obesity is a major risk factor for type 2 diabetes. The disorder has also been connected to changes in the gut microbiome. Dysbiosis, when certain strains in the gut microbiome grow too much or too little, creating an imbalance, is linked to a rapid progression in insulin resistance.

Using an approach called transkingdom network analysis, the researchers investigated how microbes interacted with their host (a mouse model) when the host was given a western diet. They wanted to know which microbes were causing which physiological effects.

The work identified four operational taxonomic units (OTUs), which group bacteria based on similarities between gene sequences, in this case that appear to affect glucose metabolism. The bacterial species were: Lactobacillus johnsonii, Lactobacillus gasseri, Romboutsia ilealis, and Ruminococcus gnavus.

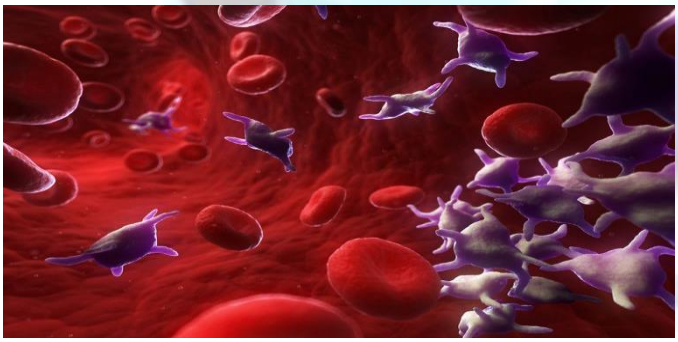
When mice were fed a western-style diet and given improvers, Lactobacilli changed how the host metabolized glucose and lipids, seemingly improving liver mitochondrial health. Compared to mice fed a western diet that did not get any gut microbes, the mice that got Lactobacilli also had a lower fat mass index.

These results were similar to a human study that was previously performed, noted the researchers. People that carried more improvers had a healthier BMI while carriers of more worseners had less healthy BMIs.

There are hundreds of microbial members of the Lactobacillus genus. Many are marketed as probiotics and can often be found in foods like yogurt.

Written by: Md. Kaykobad Hossain

Following Platelets to Diagnose Myocarditis



Diagnosing myocarditis has been a challenge for researchers. A team from the University of Freiburg in Germany hypothesized they could use platelets, a special kind of signaling agent, and MRI as a non-invasive imaging technique for myocarditis. The group had previously found that platelets accumulated in areas of myocarditis and proposed that this could be used as a diagnostic marker. They used a special compound composed of a platelet targeted antibody connected to an iron particle. In theory, this agent would collect in inflamed areas of the heart and be identified with just an MRI. They began with a mouse model following platelet accumulation in the heart after induction of myocarditis. They saw a strong accumulation early in the experiment (2 days post-induction), which seemed to peter off at later time points (14 and 21 days). Their signaling agent, which targeted activated platelets, could only bind to platelets early in the experiment. This observation was also seen in biopsy samples tested for method validation.

Unfortunately, the team could only speculate why their signal agent could not bind well to platelets later in their experiments. They hypothesize it is due to the targeting component of their agent, which targets activated platelets specifically. In theory, real-life myocarditis would constantly have activated platelets at the site of inflammation, but this study's experiments induced inflammation at one point only. One thing they could not determine was the signal difference between a heart attack and myocarditis.

Written by: Nahid Nausheen