

When fat is the solution: Using adipose cells to attenuate chagasic cardiomyopathy

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Rio de Janeiro -It could be a plot for a vampire story: In the middle of the night, blood-sucking creatures feed on peoples' faces and spread a deadly disease to the hearts of millions, who are then fated to endure a painful death.

Unfortunately, the excerpt is not [science fiction](#), and dramatically illustrates what happens to millions of people who suffer, and eventually die from, chagasic heart failure.

Chagas Disease, also known as American trypanosomiasis, is caused by the parasite *Trypanosoma cruzi* and is spread by triatomine bugs, also called "kissing bugs". Originally considered a problem of Central and South America, the disease has increasingly been found in other regions, notably in North America, where the immigration of infected individuals has fostered disease transmission by bug-independent forms such as [blood transfusion](#), [organ transplantation](#), and pregnancy. There is no vaccine for Chagas Disease.

Chronic infection with *T. cruzi* may lead to the cardiac form of the disease, which is its most severe form and affects around 30% of infected patients. Heart failure is a late manifestation of the infection that is often fatal and is thought to result from parasite persistence in the tissues. Antiparasitic drugs are not prescribed to patients with end-stage [heart failure](#), as they are ineffective in such cases.

Approximately 10 years ago, scientists began doing stem cell tests using

animal models with the aim of repairing the myocardial damage inflicted by the parasite. Cell therapy has also been tested in patients without success.

Now, a new study done by a consortium of institutions in Brazil, found that in mice, injecting a specific type of adult cell early after *T. cruzi* infection modifies these animals' response to infection. These mesenchymal stromal cells (MSC) are derived from fat tissue and are specialized in modulating the immune response.

It has been known that the parasite has some preference for the fat tissue, where it can persist for years following the infection.

"Mesenchymal stromal cells derived from the fat tissue seemed to us an effective way to put the parasites in close contact with cells that have powerful immunomodulatory effects" says Dr. Adriana Bastos Carvalho, who led the study.

Indeed, the results of the study support the authors' hypothesis, as the mice that received MSCs had fewer parasites in their blood and weaker signs of heart inflammation and fibrosis, which ultimately attenuates myocardial damage.

The next step is to test the same MSCs to treat the hearts of larger infected animals, since a black dagger may work against vampires, but it will certainly have no effect against the deadly bug.

The study entitled "Adipose Tissue-Derived Mesenchymal Stromal Cells Protect Mice Infected with *Trypanosoma cruzi* from Cardiac Damage through Modulation of Anti-Parasite Immunity " will be published on *PLOS Neglected Tropical Diseases* on August 6th.

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