

Helping healthy cells could be key to fighting leukemia, research suggests

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Researchers at Imperial College London have shown that keeping healthy blood cells alive could be a more important tool in the fight against leukaemia than keeping cancerous cells at bay.

The team used computer modelling to show that maintaining a friendly environment for healthy cells was more effective than targeting the damaged cells directly. This result could change the way [leukaemia](#) is treated, as [cancer treatment](#) has traditionally relied on fighting disease rather than maintaining health.

A better understanding of the processes taking place in the bone marrow could therefore allow doctors to take earlier and more targeted action in combating leukaemia.

A cancer of the blood, leukaemia is thought to survive and grow through the action of leukaemia stem cells (LSCs), which multiply within the bone marrow. Here they face competition for resources with haematopoietic stem cells (or HSCs), which are responsible for producing and maintaining all the different varieties of healthy blood cell within the body.

The paper, published in the *Journal of the Royal Society Interface* today, is the first attempt to model competition between these two types of cells using methods borrowed from the world of ecology.

Lead author Adam MacLean said: "The first researchers to model

competing populations mathematically were looking at predators and prey - famously lynx hunting wild hares. Whilst we don't have predator and prey cells, we have two cellular species who directly compete against each other for resources, and our models analyse how that competition plays out within the biological niche of the [bone marrow](#)."

The team carried out [computer simulations](#) to find conditions that would result in vanishing numbers of leukaemia cells. They found that the greatest chance of beating leukaemia came from maintaining a healthy population of HSCs, rather than trying to eradicate the LSCs directly.

According to Michael Stumpf, Professor of Theoretical [Systems Biology](#) and one of the paper's co-authors, "maintaining health is more likely to eradicate leukaemia than fighting leukaemia directly without taking care of the healthy [stem cells](#). And that's a slightly surprising result which nobody had explicitly stated before. It allows us to understand these processes in a way that could be important for potential therapeutic responses."

Thanks to a recent funding grant from blood cancer charity Leukaemia & Lymphoma Research, Dr Lo Celso and her team hope to refine the models outlined in the paper to more accurately simulate conditions in the human body.

Professor Stumpf added: "We want to make the model more useful, and find cases where we can break the model if it's incorrect. Its simplicity means that it's fairly robust, but we hope to reproduce the real complexity of the competition between HSCs and LSCs."

Provided by Imperial College London

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