# One drop of blood brings progression of multiple myeloma into better view

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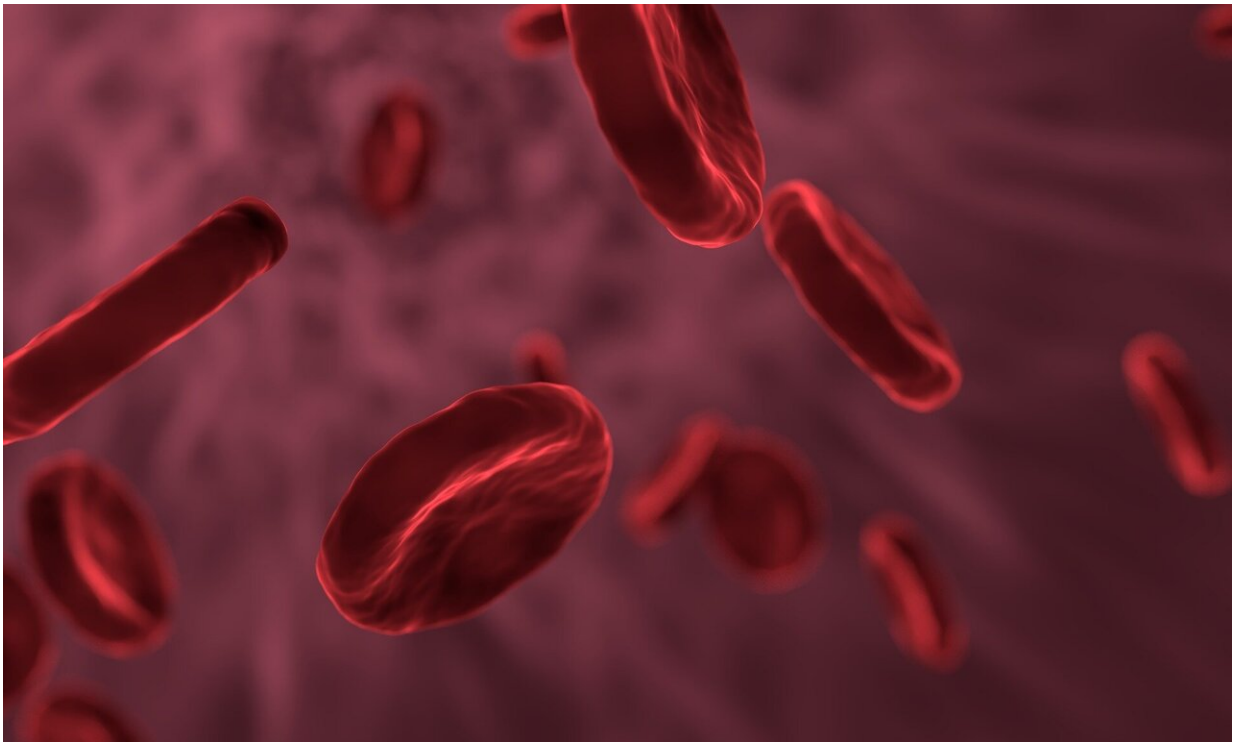

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A new method makes it much easier to follow the progression of multiple myeloma, a form of blood cancer. With a single drop of blood, it is possible to very accurately show whether the number of cancerous cells in the bone marrow is increasing in a patient. In time, this blood test could potentially replace the current bone marrow puncture.

Researchers at Radboud university medical center, in collaboration with Erasmus MC, have taken an important step towards implementing this new diagnostic, with a study published in *Clinical Chemistry*. Multiple myeloma is a severe form of blood cancer. Every year, in the Netherlands approximately 1,000 people are diagnosed with the disease. Improved treatments have made it possible to keep the disease under long-term control in an increasing number of patients. In some patients it even goes so well that no disease can be measured in the blood.

However, this does not mean that the malignant cells are all gone. Often these patient reach a state of minimal residual disease. Whether this is the case is currently measured by means of a bone marrow puncture. This is an unpleasant procedure for patients. Moreover, the test is not sensitive enough. Medical immunologist and last author Hans Jacobs: "The disease is found almost everywhere in the bone marrow, but in some areas you there are more cancerous cells than in other areas. So if you take a biopsy where there are fewer cancer cells, the test result does not accurately reflect the real situation. "

That's why there's clinical need for a good, reliable alternative. This is what Hans Jacobs, Ph.D. student Pieter Langerhorst and colleagues at Erasmus MC found in a blood test using a mass spectrometry. This test can measure unique molecules, derived from cancer cells, in the blood. These molecules reveal the presence of the cancer cells in just a drop of blood. This allows you to see very quickly if the number of cancer cells in the body, or disease activity, is increasing. A treatment (for example, medication or chemotherapy) can then be started more quickly if necessary.

## Multiple myeloma: errors in cell division

Multiple myeloma is an uncontrolled division of malignant white blood cells (plasma cells) in the bone marrow. Healthy plasma cells make

antibodies, which protect us from infections and bacteria. In patients with multiple myeloma, something goes wrong with the cell division, causing a malignant proliferation of plasma cells in the bone marrow. These cancer cells make abnormal antibodies, also called M-proteins, which then end up in the blood.

## Unique barcode for patients

Each M-protein contains a region that is unique to the cancer cells and the patient. This unique "barcode" distinguishes the healthy antibodies from those produced by the cancer cells. The research, made possible in part by KWF, showed that this barcode makes it possible to measure disease activity 1,000 times more sensitive than we are used to with current blood tests. In the current study, the scientists investigated whether the barcode in every patient is suitable for measuring with mass spectrometry.

Pieter Langerhorst: "We were able to use an international database of more than Multiple Myeloma 600 patients. In all patients we were able to find a suitable patient-specific barcode, making our new blood test applicable in every patient. This is beyond our expectations. With this study, we are taking an important step towards personalized diagnostics for patients with multiple myeloma. In the coming years, we want to do more research so that this method can hopefully be used in the clinic in due course."

**More information:** Pieter Langerhorst et al, Clonotypic Features of Rearranged Immunoglobulin Genes Yield Personalized Biomarkers for Minimal Residual Disease Monitoring in Multiple Myeloma, *Clinical Chemistry* (2021). DOI: 10.1093/clinchem/hvab017

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