New method for diagnosing leukemia developed at Aalto University

Could lead to faster, easier and more reliable results, researcher Saara Hiltunen says.

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Sweating at night, feeling tired, finding it hard to catch a breath, suffering more bruises, and especially, having an infection that won´t disappear – those are some of the symptoms that could indicate leukemia, blood cancer.

Each year, approximately 200 people are diagnosed with acute leukemia in Finland. It is the most common sort of cancer among children. Without proper care, acute leukemia can rapidly lead to death. There is adequate health care for patients, but the key thing is an early and accurate diagnosis.

The most widely used method for diagnosing leukemia, called flow cytometry, was developed in the 1960s. Now researchers at Aalto University have developed a method that could make it significantly easier for doctors to diagnose leukemia – and also to give patients more reliable results.

Until now, hospitals across Finland have used flow cytometers that are not capable of measuring all the required cellular markers in the blood samples taken. Therefore, the samples have been split into several separate tubes. The new method enables combining the information from these separated cellular samples in a biologically meaningful way, which makes analysing the data (and making a diagnosis) more efficient and replicable.

– This could automatize a part of the doctor´s work. The data has been analysed manually before, which poses an apparent risk for biased results and potentially false diagnoses, researcher Saara Hiltunen says.

In developing this new method, the researchers analyzed both mouse immune cells and human leukemia patient cells. The method is based on a generative model which is a powerful technique for unsupervised machine learning. Generative modelling describes how a data set is generated in terms of a probabilistic model, and also enables generating new data by sampling from the model.

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