Automated Method for Rapid Detection of Sickle Cell Disease Inhibitors

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Technology description

Summary

Available for licensing is a rapid and automated method for discovering potential drugs for the treatment of sickle cell anemia by determining the sickling times for a large population of red blood cells. The method uses a combination of laser photolysis and statistical processing of digital images. Sickle cell disease is an inherited disorder that affects over 70,000 Americans. The disease is characterized by presence of mutant hemoglobin S in red blood cells, which polymerizes to form fibers when deoxygenated. Such fibers lead to distortion of red blood cells into the shape of a sickle and alter the mechanical properties of these cells. Studies demonstrate that the time to polymerization involves a delay time and rapid growth phase and is particularly sensitive to hemoglobin concentration. As a result, identification of drugs that inhibit sickle cell disease is accomplished using an assay for delay times for populations of red blood cells. The invention creates a uniform time at which polymerization is initiated for all red blood cells in the sample region and accurately determines the time at which cellular distortion begins for each cell. Potential drugs are those compounds that significantly increase the delay time of sickling time, i.e. the time at which the cell changes shape due to intracellular polymerization.

Application area

Rapid automated detection of compounds that inhibit sickling and are therefore potential drugs for sickle cell disease
Objective assay for monitoring disease severity

Institution

NIH - National Institutes of Health

联系我们

叶先生

电 话：021-65679356

手 机：13414935137

邮 箱：yeyingsheng@zf-ym.com