Brief description

This above referenced technical problem is solved by the method as defined herein and the device as defined herein. The present disclosure intends to resolve the above-described enrichment dilemma.

Accordingly, the present disclosure is directed to a method for the isolation of non-magnetic cells from a heterogeneous sample solution containing biological material including desired and undesired cells, comprising the steps of:

- adding magnetic or magnetizable particles to the sample, wherein said particles have sizes in a range from 100 nm to 4 µm and exhibit surface components which support specific association with target cells, wherein said target cells comprise are either said desired or said undesired cells;
- decreasing said external magnetic field gradient;
- incubating said sample solution with said magnetic particles to obtain a magnetized cell fraction;
- washing said magnetized cell fraction using a washing solution to reduce non-specific binding;
- increasing said external magnetic field gradient;
- separating said magnetized cell fractionation of target cells from said sample;

wherein said sample solution is subjected to an external magnetic field gradient throughout said adding, incubating, washing and separating steps, and
wherein said sample solution is rotated at least during said adding, incubating and washing steps.

In an aspect, there is provided a method for the isolation of non-magnetic cells from a heterogeneous sample solution containing biological material including desired and undesired cells, comprising the steps of:

- adding magnetic or magnetizable particles to the sample solution, wherein said particles have sizes in a range from 100 nm to 4 µm and exhibit surface components which support specific association with target cells, wherein said target cells comprise are either said desired or said undesired cells;
- incubating said sample solution with said magnetic particles to obtain a magnetized cell fraction;

- washing said magnetized cell fraction using a washing solution to reduce non-specific binding;
- separating said magnetized cell fractionation of target cells from said sample;

wherein said sample solution is subjected to an external magnetic field gradient throughout said adding, incubating, washing and separating steps, and
wherein said sample solution is rotated at least during said adding, incubating and washing steps.

In another aspect, there is provided a device for labelling magnetic or magnetizable particles onto biological material that comprises

- at least one rotatable mount for sample containers having an essentially cylindrical geometry and a longitudinal cylinder axis which allows concentric rotation at various speeds using a mount-coupled driving motor,
- a magnetic device that provides adjustable magnetic field strengths as well as magnetic field gradients at the location of the sample container, said magnetic device consisting of a permanent magnet that generates a magnetic field having a magnetic field strength of equal distribution along the magnet's longitudinal axis and a magnetic field gradient in a direction perpendicular to the magnet's longitudinal axis, and
- a controller to control driving motor and the magnetic device.

An "external magnetic field gradient" in the sense of the present invention is an artificially created magnetic field gradient, i.e. a field gradient in addition to the natural field gradient of the earth's magnetic field, created by one or more magnets arranged outside external to the sample.

The method of the invention is conducted in the perpetually presence of a magnetic field gradient that has direct influence on a sample solution containing magnetic or magnetizable particles and is adjustable in strength and adapted to each of said steps