

METHOD FOR PREPARING MICROVESICLE LOW BINDING TUBES

Fields of use

Diagnostic equipment, medicine and molecular biology, microvesicles, low bind tubes

Current state of technology

Demonstrated and tested in laboratory

Type of cooperation

Commercial agreement with technical assistance

Intellectual property

PCT patent application filed

Developed by

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Summary

An innovative method for preparation of diagnostic tools (polymeric reaction tubes and other) that serve isolation of microvesicles has been developed. Method includes surface modification and enables higher yields of microvesicles by preventing their adsorption on the surface of different tools used for sampling, storage, transport and isolation of microvesicles. The researchers are looking for commercial agreement with technical assistance with diagnostic and research laboratories who are looking for optimization of isolation of microvesicles or other extracellular vesicles.

Description of the invention

Microvesicles are cellular vesicles that are involved in intercellular communication by transporting signalling molecules, mRNA and miRNA. Studies have shown that microvesicles represent an important subject in detection of various diseases such as cancer, inflammatory diseases, atherosclerosis, coronary diseases, etc. These diseases should be identified in early stage and with high accuracy. When analysing body fluids (blood, cerebrospinal fluid) it is important to isolate sustainable number of microvesicles for further analysis. Microvesicles are likely to interact with surfaces of medical tools especially reaction tube, where blood is stored and subjected to analytical technics such as centrifugation. Because of this interaction, less microvesicles are analysed and results of diagnostic tests are less reliable, which represent a significant drawback in diagnostic tests that include microvesicles.

The solution: The problem is solved by plasma treatment of inner surface of isolation and detection tools (reaction tubes, pipettes, etc) by which adsorption of microvesicles on the surface is highly reduced.

The method ensures contacting of tools with short pulses of highly ionized gas comprising both positively and negatively charged particles, which is enough to cause roughening of isolation tools on sub-micrometer or nanometer scale, as seen in Figure 1. This surface treatment strongly influences the adhesion and fragmentation of microvesicles and other extracellular vesicles. Treatment is applicable particularly on tools made of polymeric material such as polypropylene, polyethylene terephthalate and polystyrene.

Surface of polymeric tools with changed surface properties will therefore not interact with body liquids, such as human blood, in the same manner as untreated materials. Microvesicles adhere well onto the surface of untreated materials causing depletion of blood. On the contrary, the surface of materials treated according to the invention exhibits lower adhesion of microvesicles compared to untreated materials. According to the results the concentration of microvesicles isolated by prior treatment of isolation tools will increase microvesicle yields by at least two times, as seen in Figure 2.

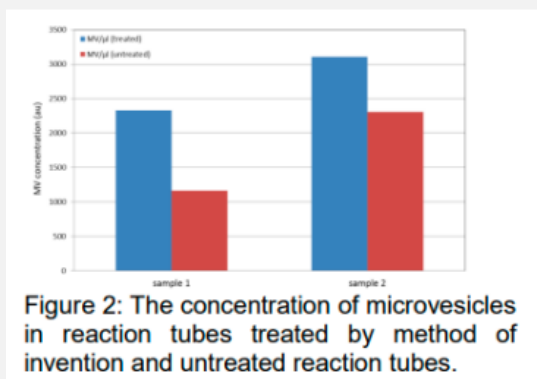
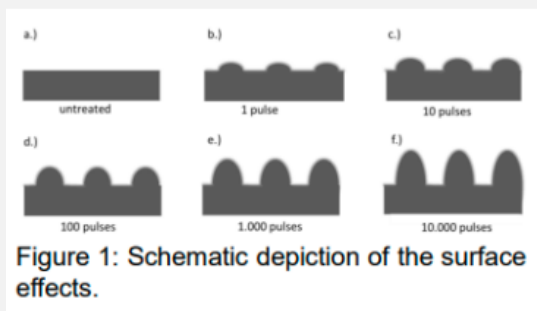


Figure 2 shows quantitative results on the concentration of microvesicles in untreated reaction tubes and reaction tube treated according to method of invention. Blood was taken from two patients, one with celiac disease (sample 1) and one with diabetes (sample 2). Jozef Stefan Institute is looking for diagnostic and research laboratories interested in optimization of isolation of microvesicles or other extracellular vesicles. Research group, that has developed the technology, has an expertise in the field of plasma and would design plasma treating device, which would include the described technology and would meet technical requirements of final user.

Main Advantages

- Technology improves yields and prevents disruption of microvesicles during isolation procedures
- Results of diagnostic tests are more reliable and accurate

Partner Sought

Jozef Stefan Institute is looking for diagnostic and research laboratories interested in optimization of isolation of microvesicles or other extracellular vesicles.