



Bio-compatibility of MagSi beads

Using the magnetic beads in blood

Our MagSi particles have been tested in whole blood and it was shown that neither hemolysis nor cytokine activation occurs.

MagSi beads can be used to separate cells or antigens out of various matrices. MagSi beads coated with Streptavidin (MagSi-SAV®), for instance, can bind biotin-labeled antibodies from blood and then be extracted using a magnet. When using the beads in blood they should not cause toxicity or inflammatory response resulting in an increase of cytokines.

Methods

The magnetic particles (*MMD16030601, uncoated, 10 µm, 30-40% ferro fluid*) were first washed 3 times with 70% ethanol to kill bacteria. Beads were pelleted in the cup using a magnet and the liquid discarded. Then the particles were suspended in ethanol, mixed, pelleted again and the liquid removed by followed by 2 wash steps with sterile double distilled water.

These **sterile particles** were then added to heparinised blood in a micro titer plate at a concentration of 1000, 500, 100 and 50 µg/ml and incubated for 4 hours at 37°C in a CO₂ incubator. After incubation the micro titer plate was centrifuged and the supernatant was measured for IL6 and IL8 concentrations using an ELISA.

The MagSi Beads were also tested for the potential to induce hemolysis of red blood cells. A diluted suspension of beads in PBS was added to washed red blood cells and incubated for 30 minutes. After centrifugation the red colour of hemoglobin was measured with a spectrometer.

Results

The concentration of IL6 and IL8 are shown in figure 1. IL6 is only slightly increased at a bead concentration of 1000 µg/ml but IL8 increases significantly at 1000 µg/ml indicating the bead has a potential to cause a pro inflammatory response of white blood cells.

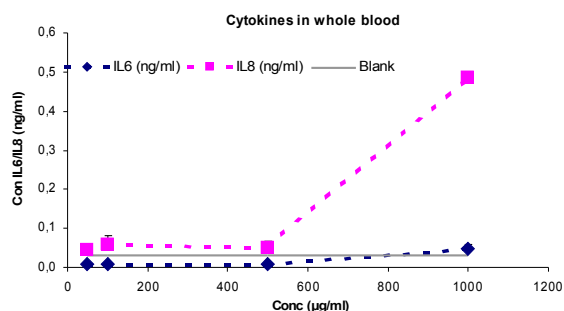


Figure 1: IL6 and IL8 production in whole blood after 4 hour incubation with uncoated MagSi beads. N=3, blank is the IL8 concentration in the sample where no beads were added. Bead: MMD16030601

No hemolysis was visible after incubation (results not shown) indicating that the particles do not induce hemolysis.



Discussion

Up to a concentration of 500 µg/ml, the magnetic bead does not induce production of IL6 and IL8 in whole blood. Only at a concentration of 1000 µg/ml, the IL8 concentration increases significantly. But this is a high concentration and the long incubation of 4 hours wouldn't be necessary in a separation/extraction experiment.

The fact that the MagSi bead doesn't immediately induce an inflammatory response or hemolysis means it can be used in tests or research with blood.