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Proof of concept of a two-stage GMR sensor-based lab-on-a-chip for early diagnostic test

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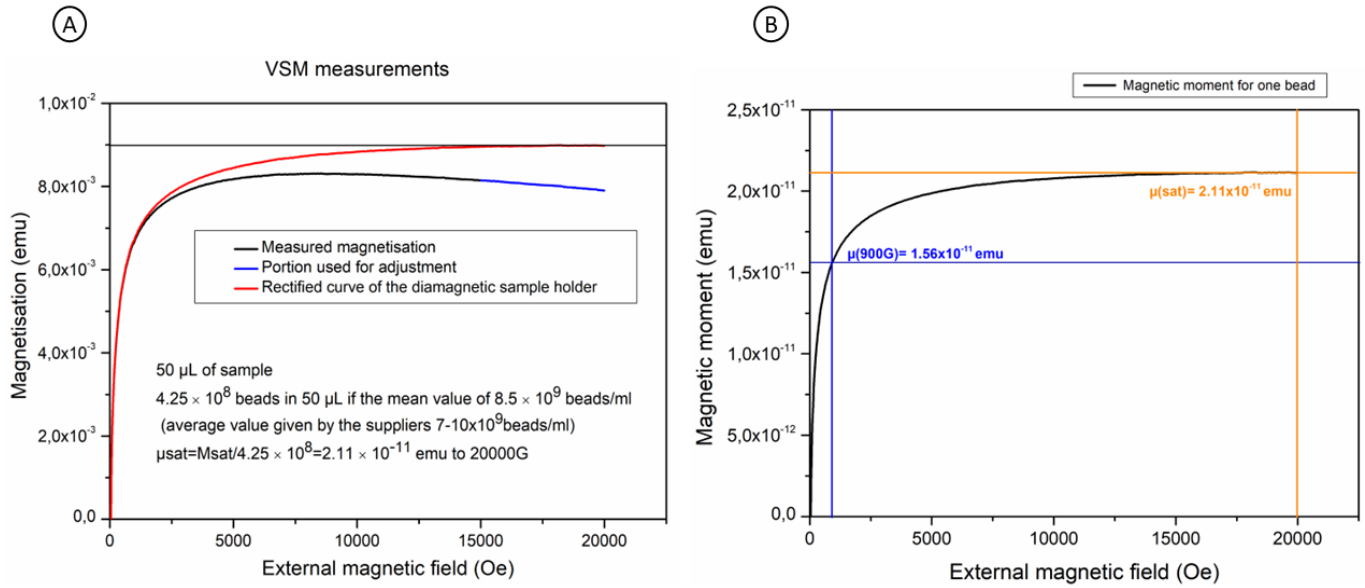

Figure S1 - A: magnetisation curve obtained on vibrating sample magnetometer (VSM) for DynaMyOne magnetic beads. B: Magnetic moment curve for one DynaMyOne bead.

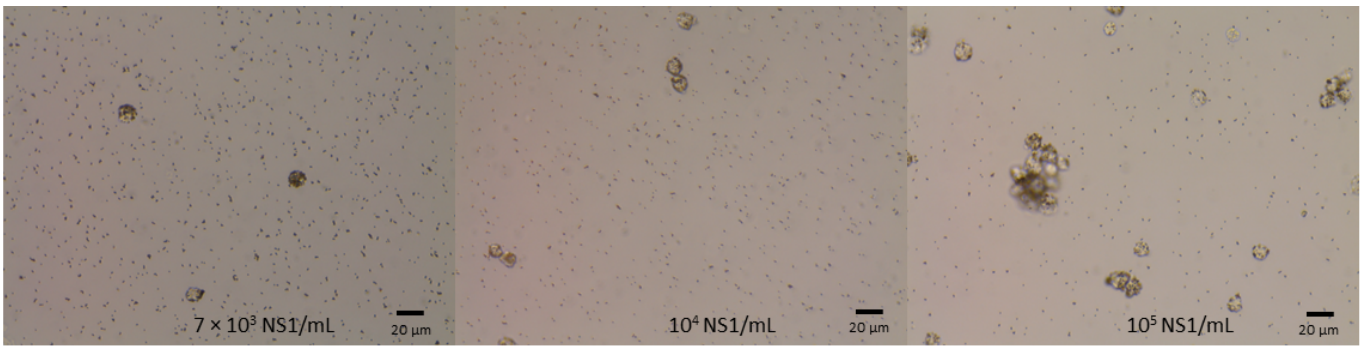

Figure S2 - Cell labelling of different concentrations of NS1 with 1.5 × 10^7 functionalised magnetic MyOne Dynabead per mL. The developed GMR sensor-based biochip aims at detecting low concentrations of cells (below 10^4 cells/mL) for an early diagnostic purpose. It is not adapted for high cell concentrations, which could cause clogging of the microfluidic channel and could distort the detection (data resolution difficulties).

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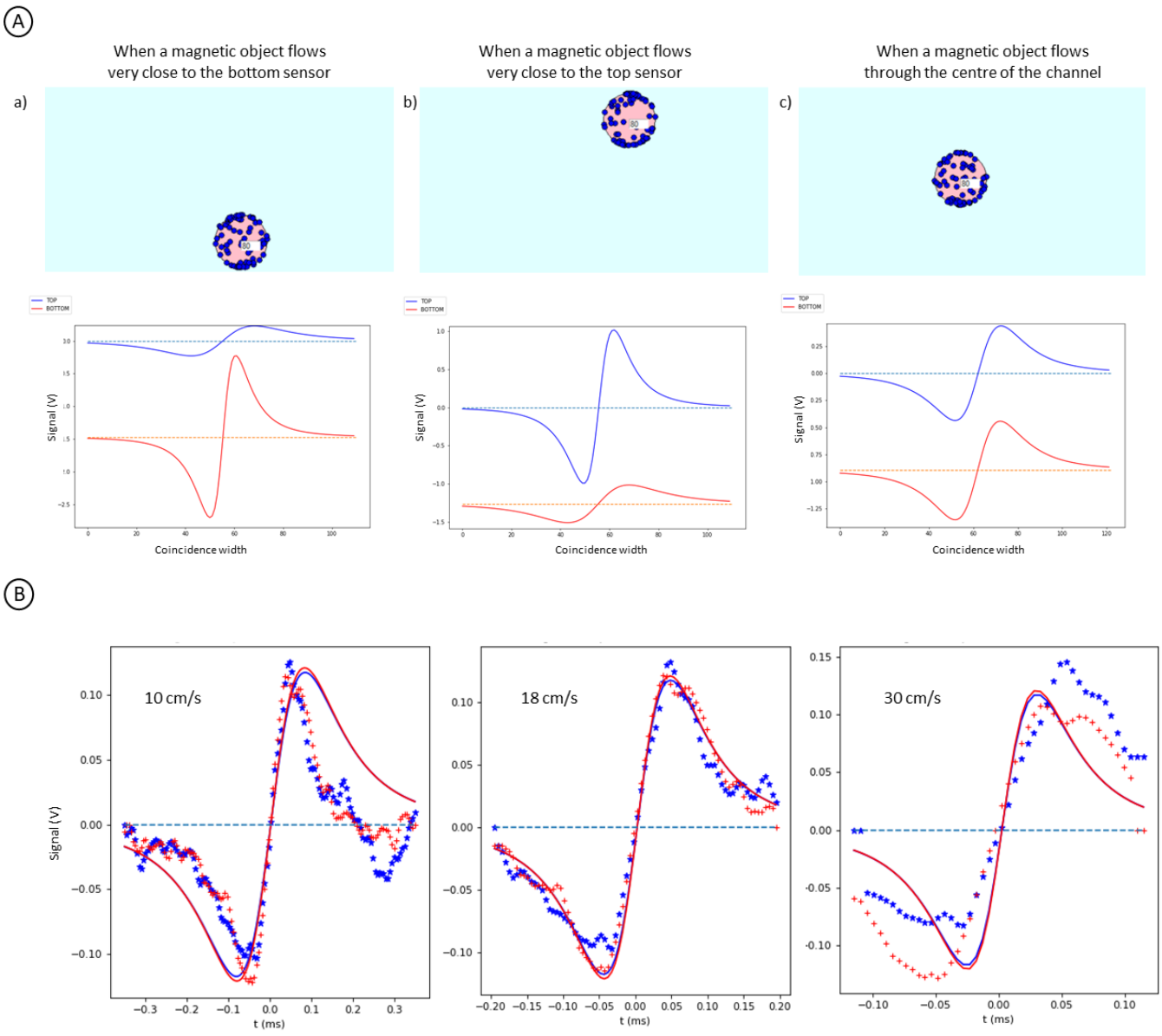

Figure S3 A: These three simulations were carried out at three different flow heights. a) When the magnetic object flows close to the bottom sensor, b) When the magnetic object flows close to the top sensor and c) When the magnetic object flows through the center of the channel. If we focus on the signal from the bottom sensor (red), we can see that the signal widens and flattens as the magnetic object moves away from the bottom sensor and becomes narrower and more intense as the magnetic object flows near the bottom sensor. When the object flows through the centre of the channel, both signals have the same amplitude. B: Simulations of an experimental coincident signal with three different velocities (10 cm/s, 18 cm/s and 30 cm/s). The simulated signal widens as the speed is decreased. The speed of 18 cm/s allows the experimental signal to be reproduced correctly.