Review of: "Biochip with multi-planar electrodes geometry for differentiation of non-spherical bioparticles in a microchannel"

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In the article the functional performance of biochip with multi-planar electrodes geometry for differentiation of non-spherical bioparticles in a microchannel was proven by COMSOL simulation. The biochip comprises a microchannel with two sensing zones; when a particle is swept thought them, electrical field between the electrodes generates an electrical signature which allows distinguishing the particle size and shape. Simulation of the process of particle passing through the sensing zones enabled to determine the electrodes placement positions for achieving the highest sensitivity of the sensor. The simulation was performed with spherical particles their diameter ranging from 1 to 10 mm. Next the process of sweeping the ellipsoid shaped particles through sensing zones was simulated. Analysis of the obtained electrical field signature allows concluding on the particle shape, but hardly is possible to judge on this type of particle orientation in the channel.

The obtained modeling and simulation results essentially prove the functionality of the sensor. Nevertheless, I would like to outline a few facts which would be interesting for deeper analysis and discussion:

Fig.3 a (Simulation of ΔE signal for spherical particle versus diameter increment from 1 to 10 in μm), Fig 4 a (Simulation of ΔE in case of Gradual change from spherical to non-spherical shape bioparticle i.e. S = 0.1–1.5) as well as Fig. S6 a and Fig. S9 a in fact have the same shape and ΔE values for the same values of sphere diameter or equivalent to it axis *b* of the ellipsoid representing the particle. Taking into account Fig. S8 showing the shape of analyzed particles, the obtained ΔE results suggests the conclusion that the dominating effect on ΔE value has dimension *b* (axis of ellipsoid) of the particle or in case of sphere shaped particle its diameter. Therefore, it would be interesting to keep the same dimension *b*, then varying the dimension *a* make comparative analysis of the obtained electrical signature. The process could be repeated for the *b* size in the range of 1-10 μm. In my opinion, such way of analysis could give some additional information enabling to judge on the particle shape.

Although this is not the scope of the article but some discussion of technological aspects of the sensor fabrication would be of interest.