

Microflow in rhythmically expanding alveolar chip with dynamic similarity

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Electronic Supplementary Information

Validation of CFD settings

The CFD results were validated by experimental results since both techniques could model the periodic movement of the alveolar wall and flow conditions, and thus should be able to capture the main feature of the fluid flow in alveoli. For example, Fig. S1 shows the comparison of velocity distributions along the vortex centerline between the simulation and experiment. It demonstrates both methods captured the shape, size and location of vortex, albeit with different velocity magnitude. However, it is not expected the detailed velocity fields match between two methods due to the geometry difference. Such a validation provide confidence that large scale parametric CFD modelling can be carried out for the alveoli.

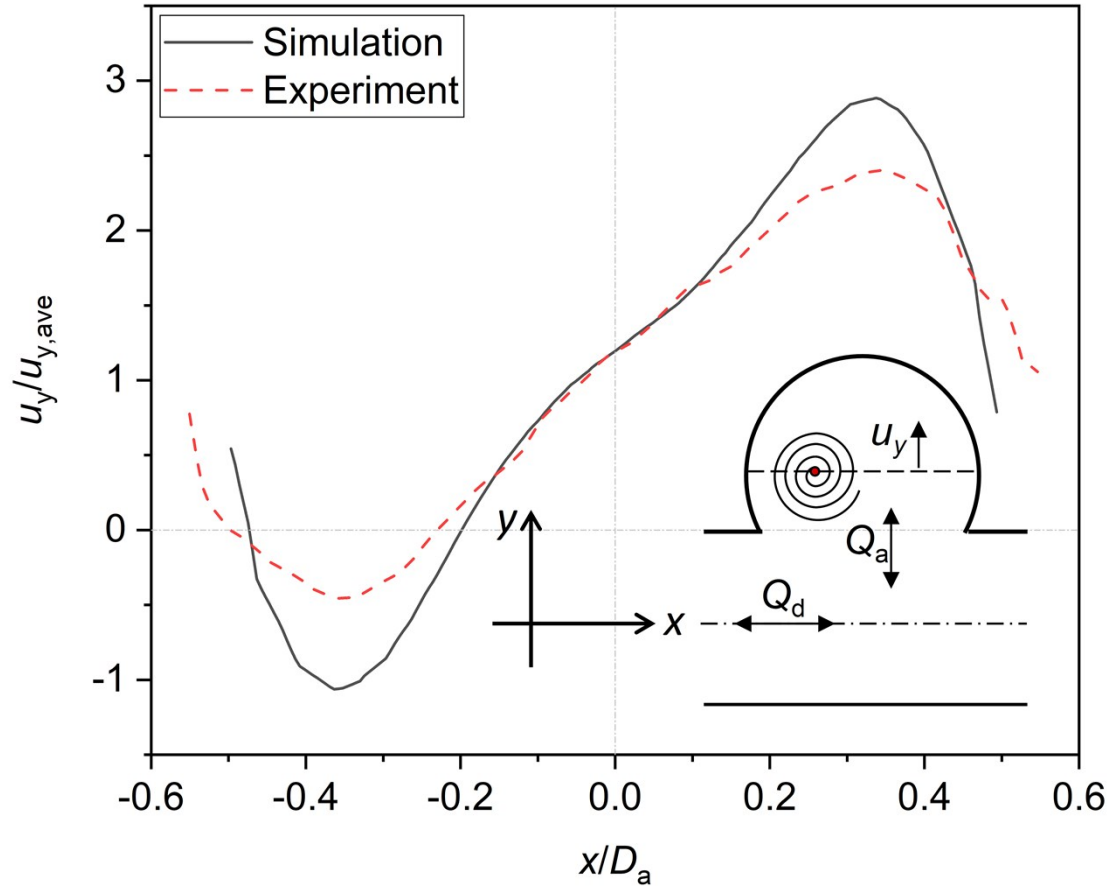


Fig. S1 Comparison of velocity distribution in the y direction along the line crossing the vortex center. $u_{y,ave}$ is the average velocity on the line. The simulation result was

derived based on the parameters of the 21st generation.