

Development of new device for manipulation of giant plasma membrane vesicles

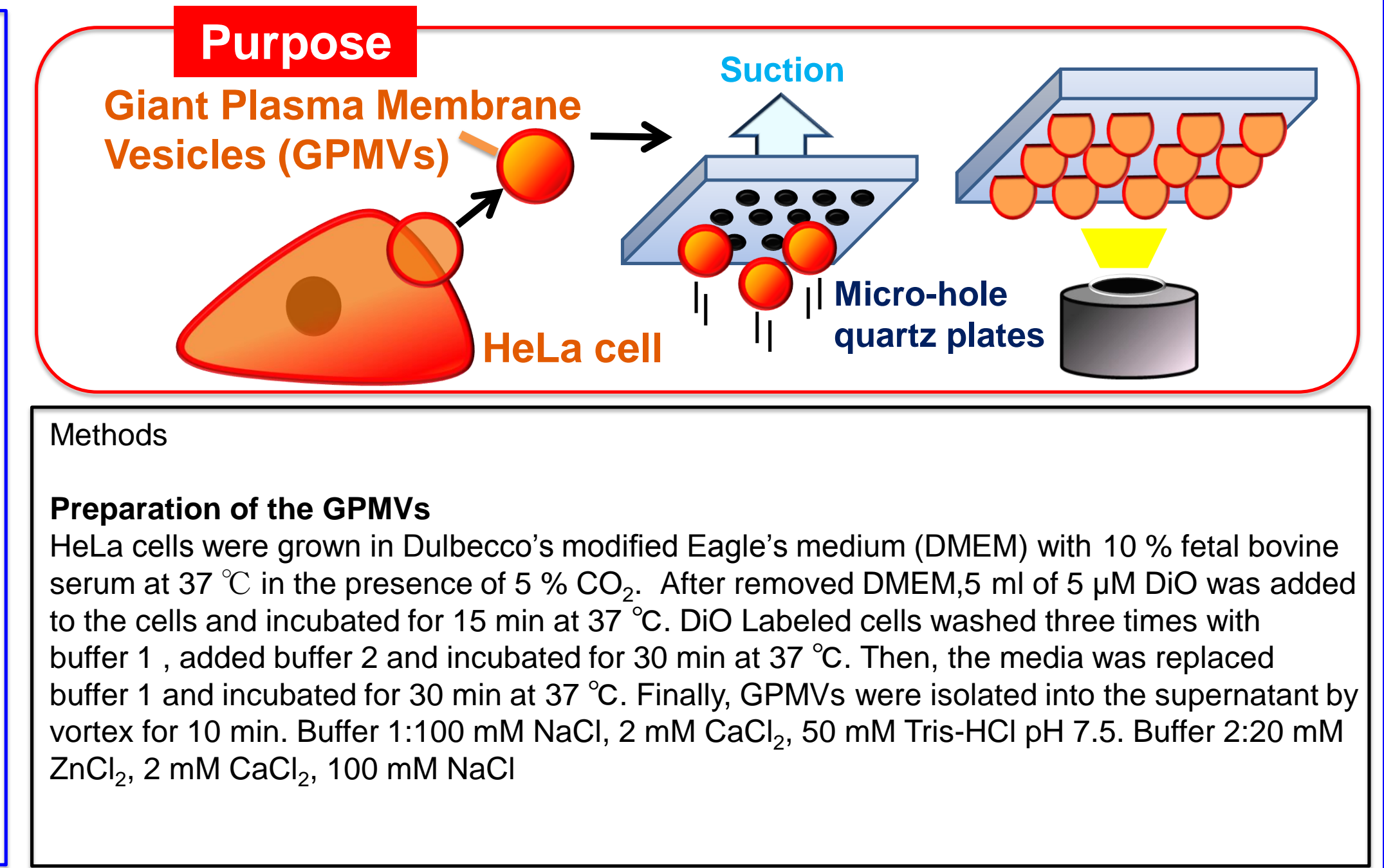
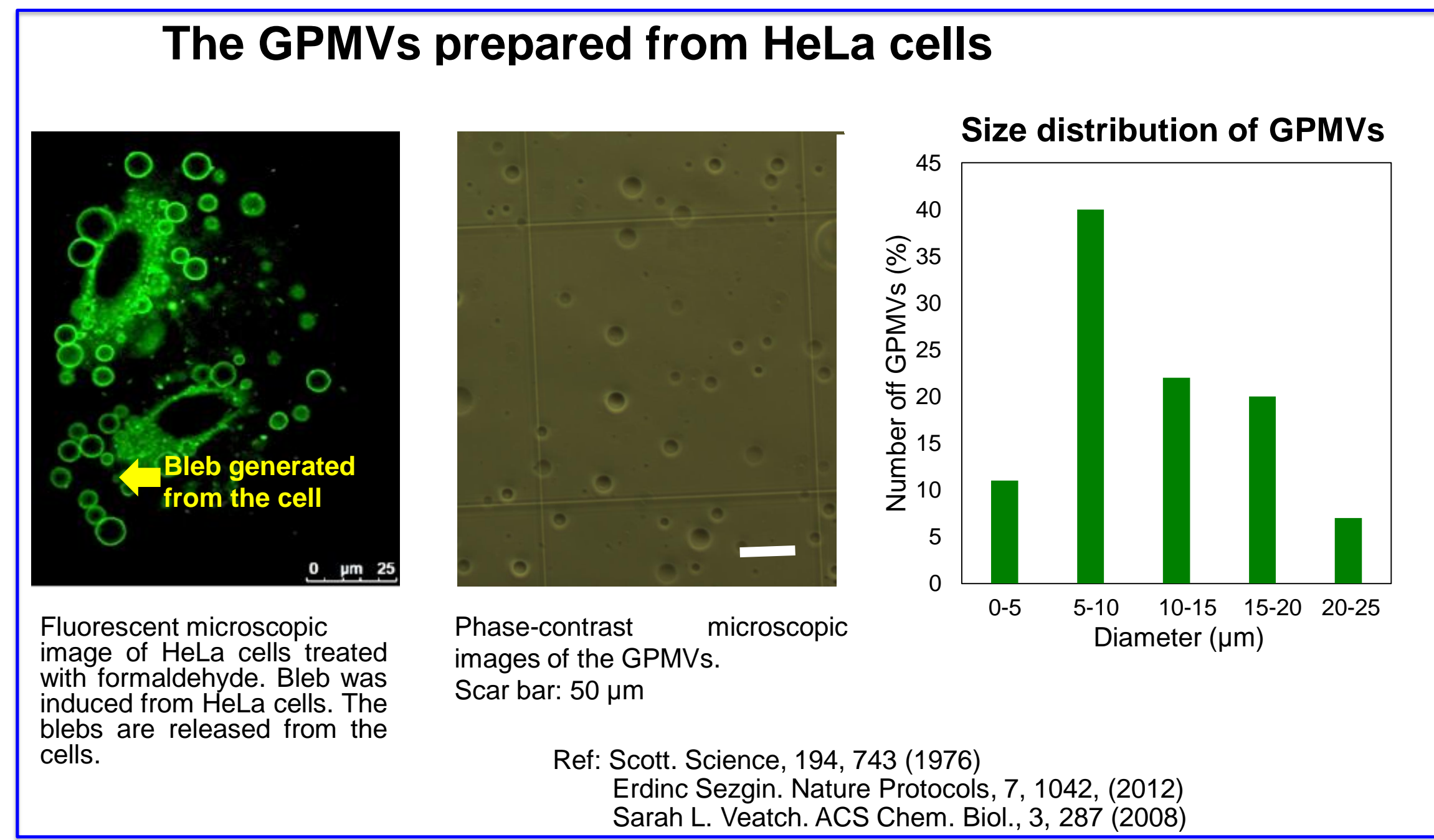
巨大細胞膜小胞をマニピュレートするための新規デバイスの開発

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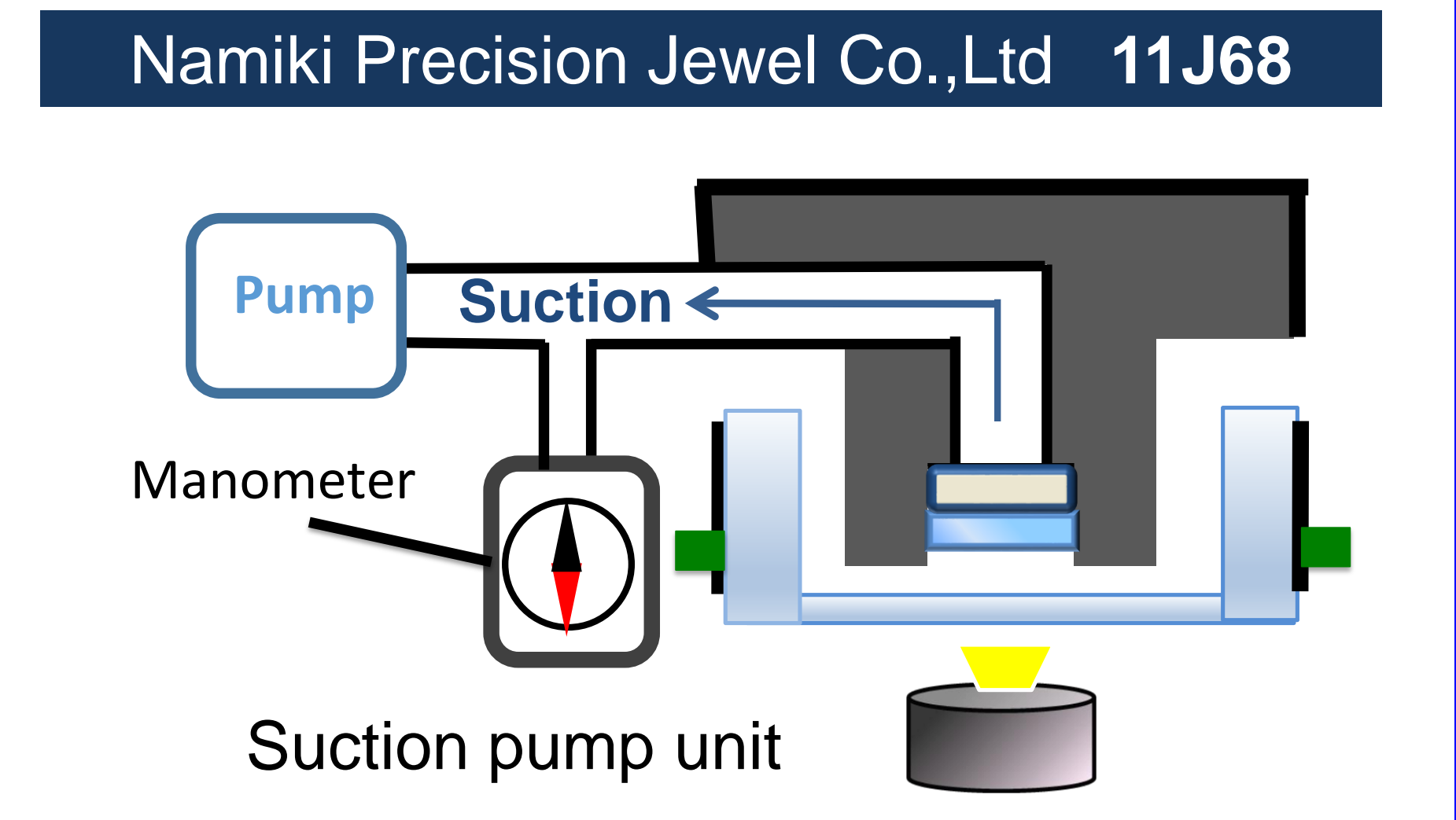
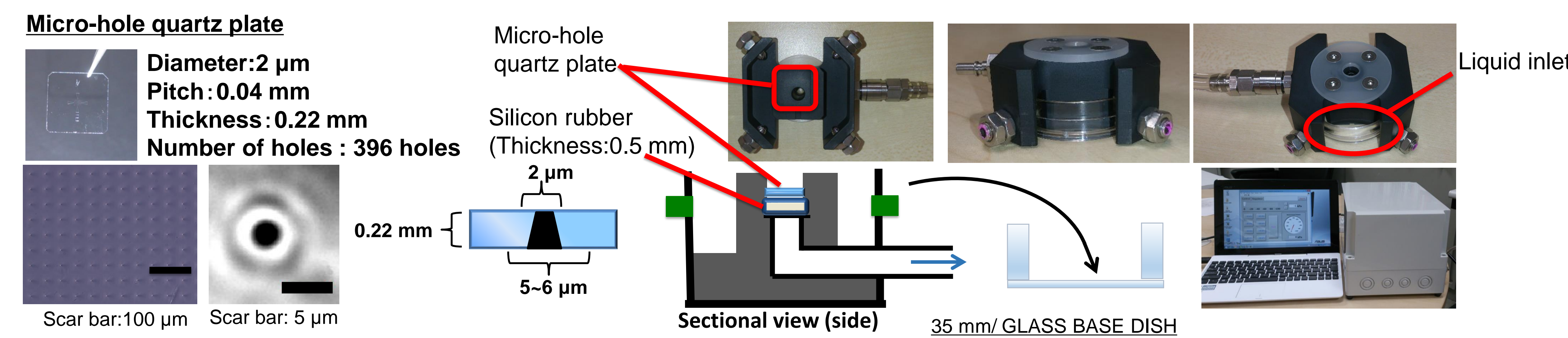
Introduction

Giant plasma membrane vesicles (GPMVs) isolated directly from cultured cell membranes are known for the useful model membranes. A protocol we reported previously produces efficient yields of large GPMVs (up to 10 μm). Recently, we have developed new device for manipulation of the GPMVs to observe specific GPMVs for a long time by an optical microscopic. We prepared micro-hole quartz plates with diameters of 2 μm and succeeded in manipulating the GPMVs on the micro-holes by suction of the solution.

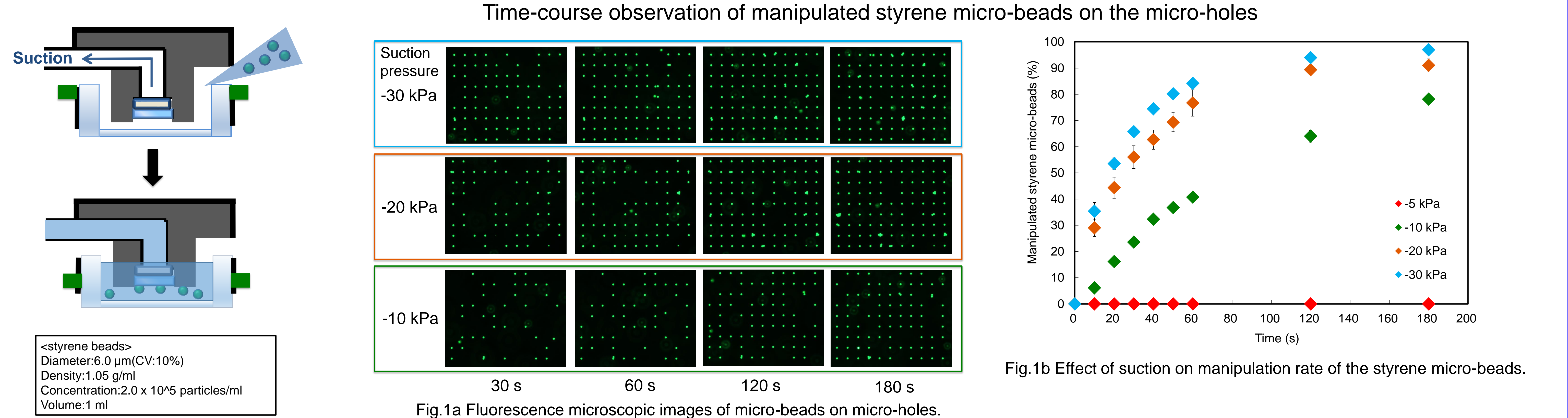


Results

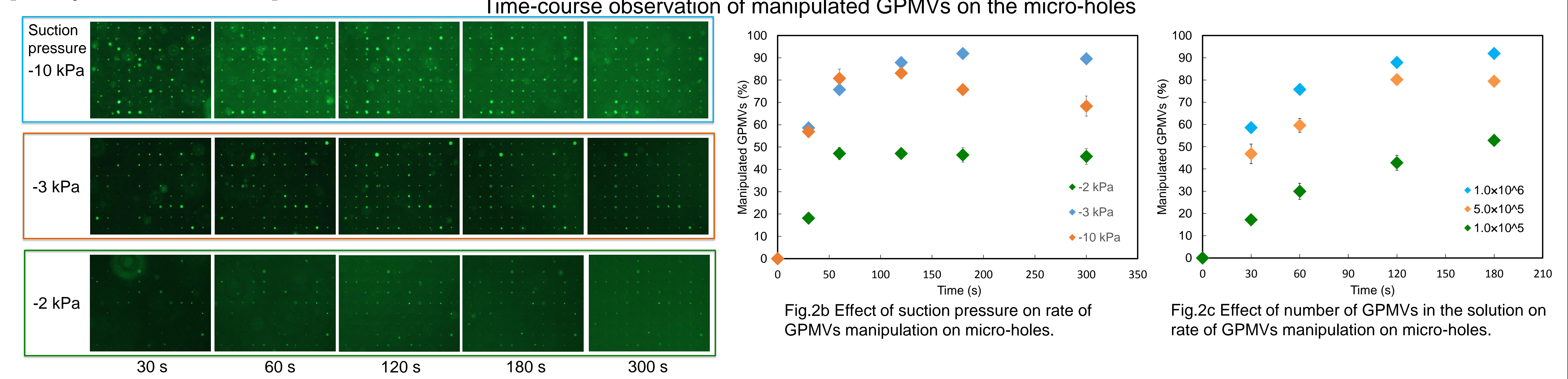
[Micro-hole quartz plates and suction pump system for microscopic observation of GPMVs]



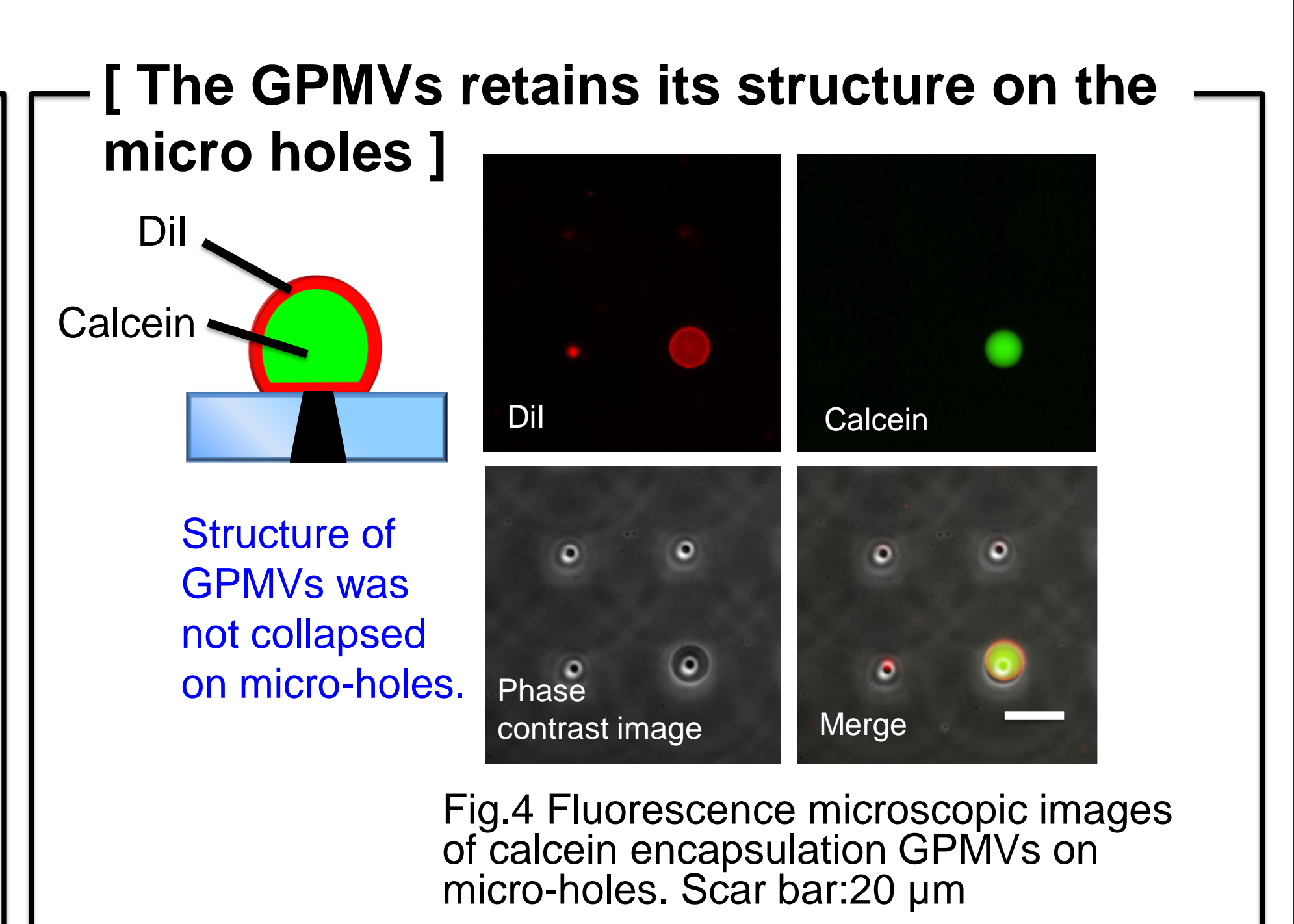
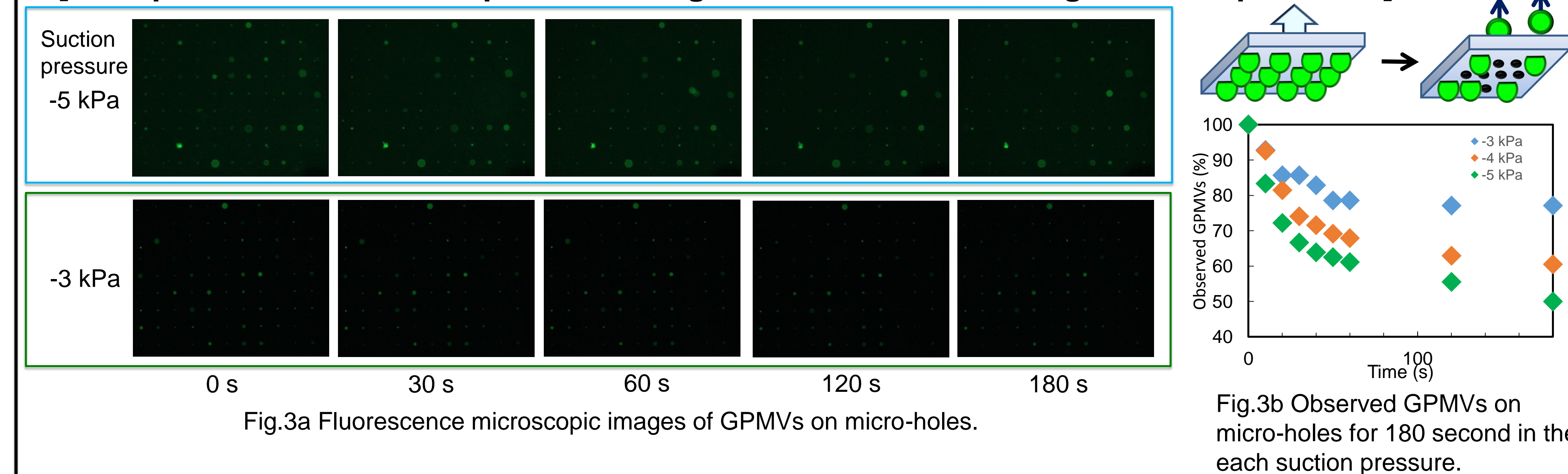
[Manipulation of styrene micro-beads]



[Manipulation of GPMVs]



[Manipulated GPMVs were passed through the micro-holes, at high suction pressure]



Conclusion

In this study, we developed new suction devices for manipulation of GPMVs to observe specific GPMVs. The devices were micro-hole quartz plates and suction pump system (suction unit). The micro-styrene beads can be manipulated on the micro-holes by using this system and the beads can be observed by fluorescence microscope. We tried to manipulate GPMVs on the micro-holes. Then, we found that moderate suction pressure for manipulation of GPMVs was about -3 kPa. Moreover, structure of GPMVs was not collapsed on micro-holes. These devices enable easily manipulation of GPMVs and observation of the GPMVs for a long time by optical microscope. We will use this system to reveal the physical properties of membrane proteins and lipids in GPMVs.