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Observation of Bright Ring Phenomenon for Red Blood Cells by Lattice Boltzmann Method¹ YOUNG WOO KIM, JI YOUNG MOON, JOON SANG LEE, Yonsei Univ — RBC (Red Blood Cell) aggregation is one of interests for various biomechanical fields such as cell chip or visualization. The unique phenomenon called bright ring is due to RBC aggregation in pulsatile flow of blood. Shear rate and flow acceleration on RBC causes them to repeat aggregating and scattering from center of the channel. The reason that this phenomenon is called bright ring is because that when observed by ultrasound imaging, the bright ring occurs periodically (Paeng DG et al., 2004). Many studies tried to observe this bright ring phenomenon experimentally (Paeng DG et al., 2009). However, there are yet not many studies trying to make use of this phenomenon for practical purposes. Bright ring phenomenon has high potential when used for cell separation or other microchip devices (Mehmet T et al., 2005). In this paper, the Lattice Boltzmann method is used to control this bright ring phenomenon. The purpose of this paper is to find conditions when bright ring phenomenon occurs, and to control the aggregating-scattering frequency and degree. Deformability of RBC is calculated following the work of Moon JY et al (2016). The result of this paper could be further extended to the optimization of cell-separating microchips.

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