Supplementary Material

# Supplementary Figures



**Supplementary Figure 1.** Mechanical tests on a hexagonal patch of membrane. **(A)** uniaxial stretching. **(B)** shearing, after Závodszky et al. (2017) under [CC-BY 4.0](https://creativecommons.org/licenses/by/4.0/) license.

A screenshot of a graph

Description automatically generated

**Supplementary Figure 2.** Comparison of the behaviour of CTCs in the straight vessel with that in theregions of the curved vessel in terms of **(A)** the number of adhesion bonds, (**B)** aspect ratio, and (**C)** cell axial velocity.

A graph of a function

Description automatically generated

**Supplementary Figure 3.** Spatial distribution WSS ratio on the inferior curvature in the curved vessel with various amplitude magnitudes (a) relative to a straight one considering pure blood flow without any cell with the same Reynolds number. Various geometries of the curved vessel related to different amplitudes are depicted on the right.

# Supplementary Table

Supplementary Table 1 **Parameters used in the model.**

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | **Definition** | **Physical value** | **References** |
|  | Absolute temperature |  | (Chang and Hammer, 1996) |
|  | Unstressed forward reaction rate |  | (Zhang et al., 2018) |
| Poff | Power parameter for modulating the effect of shear stress on the rate of bond rupture | -3 | (Yan et al., 2012) |
| Pon | Power parameter for modulating the effect of shear stress on the rate of bond formation | 1 | (Yan et al., 2012) |
|  | Unstressed reverse reaction rate |  | (Zhang et al., 2018) |
|  | Link force coefficient (equivalent to G=90mN/m) | 150 | (Lenarda et al., 2019) |
|  | Bending force modulus | 600 | (Cui et al., 2021) |
|  | Local area conservation coefficient (equivalent to Poisson's Ratio of 1/3) | 250 | (Tan, 2015) |
|  | Volume conservation coefficient1 | 600 | - |
|  | Transition state spring constant |  | (Zhang et al., 2018) |
|  | Bond spring constant |  | (Zhang et al., 2018) |
|  | Equilibrium bond length in adhesive dynamics model |  | (Dabagh et al., 2020) |
|  | Cut-off length for bond formation |  | (Dabagh et al., 2020) |
|  | Boltzmann constant |  | (Dabagh et al., 2020) |
|  | Time interval |  | (Wang et al., 2013; Wu and Qi, 2019) |
|  | Fluid Average Shear rate () | 200 | (Zhang et al., 2018; Dabagh et al., 2020) |
|  | Fluid lattice resolution |  | (Lenarda et al., 2019) |
|  | Microvessel diameter |  | (Lenarda et al., 2019) |
|  | Length of the periodic microvessel domain |  | - |
|  | Kinematic viscosity of plasma |  | (Dabagh and Randles 2019) |
|  | Dynamic viscosity of plasma |  | (Dabagh and Randles 2019) |
|  | CTC baseline radius |  | (Suresh 2007; Anvari et al.2021) |

1. **Volume modulus is chosen to be large but numerically stable (Závodszky et al., 2017).**

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