Exploration into practical significance of integral water permeability of textile vascular grafts

Guoping GUAN,1,2 Chenglong YU,1,2 Xuan FANG,2 Robert GUIDOIN,2,3 Martin W KING,2,4 Hongjun WANG,5 Lu WANG 1,2*

1 Engineering Research Center of Technical Textiles of Ministry of Education, College of Textiles, Donghua University, Shanghai, 201620, China

2 Key Laboratory of Textile Science & Technology of Ministry of Education, College of Textiles, Donghua University, Shanghai, 201620, China

3 Department of Surgery, Université Laval and Centre de Recherche du CHU de Quebec, Quebec, QC G1V 0A6, Canada

4 College of Textiles, North Carolina State University, Raleigh, NC 27616, USA

5 Department of Biomedical Engineering, Stevens Institute of Technology, Hoboken, NJ 07030, USA

**Corresponding authors:**

Lu Wang PhD, Key Laboratory of Textile Science and Technology of Ministry of Education, College of Textiles, Donghua University, Shanghai, 201620, China. Email: wanglu@dhu.edu.cn
Supplemental materials

**Correlations of the water permeability and the simulated plasma permeability**

Favorable linear correlations between the water and the simulated plasma permeability of four samples, and between the first minute permeability of the water and the simulated plasma under varying testing pressures, were found regardless of the testing pressures as shown in Fig. S1. Even the water and the simulated plasma have distinct viscosities, their permeability shows steady correlations under these testing pressures and over time. Thus, prediction to the simulated plasma permeability through testing the water permeability is feasible.

![Figure S1](image)

**Figure S1.** A, Correlations between the water and the simulated plasma permeability. B, Correlations of the first minute permeability at varying testing pressures. (a) S1, (b) S2, (c) S3, (d) S4
**Correlations of the simulated plasma permeability and the whole anticoagulated blood permeability**

Linear correlations were also established between the simulated plasma permeability and the whole anticoagulated blood permeability of S1, S3, and S4 at testing pressures lower than 14 kPa (Fig. S2). While the correlations at the higher testing pressures showed quadratic equations with higher $R^2$. This may be attributed to the fact that the blood permeability showed a sharp decrease within the beginning several minutes and this decrease became even more pronounced under the higher testing pressures. Interestingly, the correlations of S2 seemed exceptional since all five equations were quadratic ones. The weft count of S2 is 500/10 cm, the same as the above shown, this might be the critical value in determining the permeability and the mechanical properties. In future, it still deserves to explore.
**Figure S2.** A, Correlations between the simulated plasma permeability and the anticoagulated whole blood permeability. B, Correlations of the first minute permeability at varying testing pressures. (a) S1, (b) S2, (c) S3, (d) S4

**Figure S3.** Light microscopy microphotographs of the infiltrated endothelial cells on the culture plate surfaces. Cell densities decreased with the decrease of the porosity.