

Biochemomechanical coupling theory of lymph nodes

Xi-Qiao Feng

Institute of Biomechanics and Medical Engineering, Department of Engineering
Mechanics, Tsinghua University, Beijing 100084, China
Email: fengxq@tsinghua.edu.cn

Lymph nodes play a crucial role in the inflammation-homeostasis evolution and immune memory genesis of immune systems. However, the dynamic behaviors of lymph nodes, and the underlying biomechanical mechanisms as well, remain elusive. In this talk, an inflammation-homeostasis dynamic theory of lymph nodes is presented from the viewpoint of continuum mechanics and thermodynamics. The mechano-chemo-bio coupling mechanisms are taken into account by combining the porous theory, the volumetric growth model, and the internal variable concept. This model can simulate the evolutions of stress fields, deformations, and the number and ratio of cells in a lymph node during the inflammation-homeostasis process. Moreover, the inflammo-mechanical coupling effects are analyzed. This theory can not only deepen our understanding of the dynamics of immune systems, but also inspire for the diagnosis and therapy of relevant diseases.

References

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