2018 年 5 月 11 日

日本機械学会北海道支部　バイオメカニクス懇話会
第 33 回講演会

（共催：日本機械学会北海道支部，日本機械学会バイオエンジニアリング部門「計測と力学−生体への応用−」研究会）

主査　大橋　俊朗

下記の要領にて第 33 回講演会を開催いたします. 本講演会は日本機械学会北海道支部特別講演会，日本機械学会バイオエンジニアリング部門第 59 回「計測と力学−生体への応用−」研究会と共催いたします．皆様のご参加をお待ちしております.

記

日　時：2018 年 5 月 25 日（金），14:00〜15:00
場　所：北海道大学大学院工学研究院・工学部　A6-68 室（共用研究室 3）
講　演：

「Cellular responses to mechanical influences of the extracellular environment」

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Cells in our body respond to various mechanical influences such as substrate rigidity, mechanical confinement, fluid shear stress, mechanical force between cell-cell adhesion etc.. Cellular responses to such mechanical stimulations have important roles to modulate many physiological processes. In this talk, I introduce two stories focusing on substrate rigidity and mechanical confinement.

Substrate rigidity affects physiological processes through mechano-chemical signals from focal adhesion (FA) complexes that subsequently modulate gene expression. We found that shuttling of FHL2 between FAs and the nucleus depends on matrix mechanics. In particular, on soft surfaces or after the loss of force, FHL2 moves from FAs into the nucleus and concentrates at RNA polymerase II sites causing an increase in p21 gene expression that will inhibit growth on soft surfaces. At the molecular level, shuttling requires FHL2 phosphorylation by active FA kinase (FAK). Thus, we suggest that FHL2 phosphorylation by FAK is a critical, mechanically dependent step in signaling from soft matrices to the nucleus to inhibit cell proliferation by increasing p21 expression (Nakazawa et al., 2016, PNAS).

Recently we have started new project focusing on mechanical confinement during brain development. Cortex formation in the brain is developed through migration of newly born neurons in crowded neural tissue. High resolution time-lapse observation reveled that neuronal migration was accompanied by dynamic motion of nucleus such as rotation and change of its shape. Latest study from our group suggests that a point force by microtubule motors drives nuclear motions during neuronal migration in confined space (Kure et al., 2018, Development). On the other hand, nuclear stiffness is also expected as an important factor to induce neuronal migration. I am going to share preliminary results about nuclear stiffness in the migrating neurons.

問い合わせ先：
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