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Title: Perturbation of adhesion-contractility crosstalk leads to impaired wound healing in diabetes

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Abstract

Diabetes is a chronic disorder that leads to multiple complications including impaired wound healing. Altered fibroblast function is one of the major causes which impair wound healing in diabetic patients. However, alterations in mechanics of diabetic fibroblasts has not been adequately probed. Here we have performed a detailed biophysical characterization of normal and diabetic fibroblasts to understand the biophysical alterations associated with diabetes. We show that compared to normal primary fibroblasts, diabetic fibroblasts are more elongated, less contractile, softer, and less motile. Lesser motility of diabetic fibroblasts can be partly attributed to formation of prominent focal adhesions in these cells. This decoupling of contractile mechanics from adhesion dynamics may partly explain reduced wound healing in diabetic patients. Re-establishment of this crosstalk may pave ways for new strategies for rescuing impaired wound healing in diabetic patients.

Keywords: Diabetes, wound healing, fibroblasts.

Recent Publication

1. Jahan, I; George, E; Saxena, N; Sen, S. Silver-Nanoparticle-Entrapped Soft GelMA Gels as Prospective Scaffolds for Wound Healing *ACS Applied Bio Materials* **Article, 2019, ASAP** DOI: 10.1021/acsabm.8b00663.
2. George, E.; Barai, A.; Shirke, P.; Majumder, A.; Sen, S. Engineering Interfacial Migration by Collective Tuning of Adhesion Anisotropy and Stiffness. *Acta Biomater.* **2018**, *72*, 82–93. https://doi.org/10.1016/j.actbio.2018.03.016.



Biography:

Mrs. Iffat Jahan is currently working as a Ph.D. student in Cellular Biophysics lab, department of Bioscience and Bioengineering, Indian Institute of Technology Bombay, Mumbai, India. She has expertise including fibroblast isolation from human tissue samples, cell culture techniques, immunocytochemistry, Microscopy including Cryo-SEM and molecular biology techniques such as RNA isolation, cDNA synthesis, RT-PCR, Zymography etc. She has completed her Masters in Biotechnology stream from Indian Institute of Technology, Guwahati, Guwahati, India and also joined a project "Isolation and characterization of an organic plant compound from *Pongamia pinnata* seed and check their antibacterial activity" under the supervision of Prof. Latha Rangan in IIT Guwahati. Moreover, she has also worked on a project "Standardization of biosynthesis of gold nanoparticle by using the different concentration of bromelain" during her B.Tech. in Biotechnology from Integral University, Lucknow, India.

Desired presentation: Either

Topic: Wound Heling and Tissue Repair

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