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Title: Heterochromatin-mediated Mechanosensing for Tumor Dormancy

Almost all cells from unicellular organisms to human can enter dormancy where cells remain inactive and resistant to environmental stress. Dormant tumor cells are resistant to most conventional therapies and are one of the main problems leading to tumor-associated deaths. Often patients long clinically cleared from cancer undergoes relapse in years and sometimes in decades. This is an understudied area in cancer biology, and we propose to investigate how sensing the surrounding stiffness affects tumor dormancy.

We have previously shown that dormancy requires shutting down inactive regions within the genome, known as heterochromatin, and recent studies showed that heterochromatin affects tumor progression and aggressiveness. Cells can sense their surroundings and alter the organization of the membrane in response. Heterochromatin is found at the nuclear membrane where the information of sensing surroundings is gathered and processed. Such evidence suggests that heterochromatin is the link between microenvironment sensing and tumor dormancy, and we will test it by using yeast and human cells. Our approaches will advance the current understanding of tumor dormancy and may lead to novel therapeutic interventions for dormant tumor cells.