Poster Number

27 **The funcitonal characteristics of a Alu-derived noncoding RNA, TIFm71**

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Noncoding RNAs which do not encode proteins are involved in many crucial biological processes and are increasingly important. The transcript of a novel CXC chemokine TIF (Tumor-Induced Factor) which was identified originally from mas- induced xenograft has a long 3'-UTR containing an antisense Alu element. The Alu elements are conserved repeat sequences that belong to the SINE family of retrotransposons found abundantly in primate genomes and their functions remain elusive. Our study showed that a 71nt fragment named as TIFm71 embedded in the middle of Alu element was processed out from TIF mRNA transcript and played regulatory role independently. TIFm71 was predicted to fold into a stem loop structure which is similar to pre-miRNAs. Using TIFm71-overexpressing stable cell line, we found that TIFm71 overexpression induced epithelial-mesenchymal transition (EMT) and the stable clone displayed higher cell mobility. Western protein analysis showed a higher phosphorylated ERK protein level, which suggested that TIFm71 induced EMT through ERK pathway. In addition, a GFP reporter system was used to probe the regulatory role of TIFm71 on gene expression. Comparing to the control, a significant reduction of GFP protein was noted, suggesting that TIFm71 negatively regulated the expression of the coding transcript. Our study may provide a new direction to explore functions of Alu element.

28 **Cyst formation: Mathematical Model and Data Analysis**

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Organisms always grow and develop in a precise way. It is precise in both temporal and spatial aspects. It is believed that the development of organism is under precise and complex controlling, but the underlying mechanism is still not known. A lot of efforts have been made in studying the development of branching tubular structure in lung and kidney, but little study has focused on the formation of cyst, which is a hollow spherical structure made of one layer of epithelial cells. However, some diseases such as polycystic kidney disease are related to the production of cyst. The knowledge of cyst formation will not only help us deal with these diseases, but may enable us to manipulate and engineer the epithelial tissue into certain shape and size in synthetic biology.

We are approaching this topic by investigating the process of cyst formation from both experimental and theoretical aspects. We embedded Caco-2 cell, which is an epithelial-like cell line, in jelly-like Matrigel to grow into cyst for further measurements and experiments. Our previous work has found that the mechanical force may have important role in the cyst formation process, so we attempt to build mathematical model to understand the process and propose new experiments. The model can be based on continuum mechanics, or some abstract assumptions of a discrete system. We will also apply computer vision techniques to analyze the large amount of image data from experiments, like 3D reconstruction, edge detection, and cell tracking.