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Proliferation of cancerous cells on PDMS substrates with tunable stiffness

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One of the most extensively explored biomedical subjects is the search for new diagnostic and therapeutic tools, which would allow detecting the disease at the very early stage, recognizing the type of pathology and selecting the best personalized therapy. As the progress of cancer is determined by non-limited proliferation and migration of cancerous cells and their ability to invade the regions occupied by other cells, it is extremely important to study cell - external surrounding interaction and to recognize the influence of external factors on cell behavior. Mostly investigated factors influencing cellular response include surface topography, chemistry and wettability. Recently it has been shown that also mechanical properties of the substrate play an important role for adhesion and proliferation of cells. To study the effect of substrate stiffness on cell behavior we performed experiments for cancer cells cultured on two groups of bare polydimethylsiloxane (PDMS) substrates, characterized by elastic modulus of 0.75 MPa and of 2.92 MPa. The results directly prove that the substrate stiffness strongly influences the behavior and morphological properties of cancer cells. The possibility to moderate cellular response on substrate properties differently for each cell line enables easy and accurate distinguishment between not isolated healthy and cancer cells, which is a powerful tool, giving new possibilities in early diagnostic and personalized therapy.

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Anatomical variations of the uncinat process in computerized axial tomography (CAT) in Colombian patients with diagnosis of chronic sinusitis

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The objective of this research work was to describe the uncinat process anatomy and its variations observed through coronal, multislice computed tomography (MSCT) in patients with chronic rhinosinusitis. The reports agree that the anatomical variations of this complex are part of the causes of chronic sinusitis refractory to medical treatment, which motivated the present work to study the anatomy of this complex and identify possible anatomic variations in adult patients from Colombia, diagnosed with chronic sinusitis. A descriptive, cross-sectional, observational and retrospective study was carried out. Continuous variables were estimated with measures of central tendency and dispersion with a confidence interval of 95%. Categorical variables were determined with frequencies and percentages. The total sample was 143 cases. In the sample, 53.8% were men and 46.2% were women. Both of the right and left the uncinat process of the ethmoid was inserted into the lamina papyracea in 49.7% and 53.1% of cases, respectively. The insertion of the uncinat process in the cribriform plate of the ethmoid (T6) had a frequency to the right side of 25.2%, but for the left side was the insertion into the middle nasal concha (T1) (23.8%). In most cases, the uncinat process had a lateral orientation and 51% on the right side and 56.6% on the left side. The uncinat process is a highly variable anatomical structure at each side of the nasal cavity, arranged in different insertion sites, changes in angle and different lengths which is important from the point of view of surgical management of chronic rhinosinusitis.

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