

50%XG/50%KGM; 60%XG/40%KGM; 75%XG/25%KGM). To evaluate the human fibroblasts cell viability in the presence of XG/KGM hydrogels, optical microscopic evaluation and MTT assay were performed. After 24 h and 72 h, optical microscopic images showed that fibroblasts adhered and proliferated in presence of hydrogels. The MTT results confirm these data, once cell viability was not affected, highlighting the hydrogel biocompatibility.

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Automatic blurry colon image detection using laplacian operator-based features

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Colonoscopy and wireless capsule endoscopy are the most common techniques to monitor and detect abnormalities in the colon. During this process, probe or capsule movement causes blurry images. Detection and removal of blurry images is critical for further automatic abnormality detection procedures. Several methods based on wavelet transform, Canny edge detection, discrete Fourier and cosine transform have been proposed so far. The Laplacian operator-based approaches have not been used on colon images yet. In this study, we extracted four features from colon images based on Laplacian operator for the discrimination of blurry images from visually normal images. The features were the energy and variance of the Laplacian of the images, the average of pixels obtained using diagonal and modified Laplacian operator. We used 80 frames (40 of them were blurry) selected from videos that are available in an open-source database (<https://www.gastrointestinalatlas.com/>). The features were utilized as the inputs to various classification methods, where cubic support vector machines resulted in the best performance. The classification accuracy values we obtained were 82.5%. The results of this study indicated that for the automatic detection of blurry images in colon videos Laplacian operator-based features were feasible.

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A new system that allows modification of the pressure occurring in blood vessels at force application during orthodontic tooth movement

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One of the main goals of orthodontic treatment is to complete the treatment by correcting and moving the teeth as soon as possible. Several methods have been introduced to accelerate orthodontic tooth movement. The aim of our study is to determine if the movement of the tooth will accelerate by increasing the blood flow in the tissues surrounding the tooth during force application. A new system has been designed for this purpose. The study was completed in 21 patients who underwent first premolar extraction. Split mouth design was used. On one side, interrupted force was applied while on the other side modified interrupted was applied. The modified intermittent force application was performed by the activation–deactivation–activation protocol. Thus, the compression

in the peripheral blood vessels was prevented and the cellular response was increased. Records were obtained at the beginning of the treatment and the completion of canine distalization. The duration of completion of canine tooth distalization on each side was calculated. IL1, IL6, OPG and RANKL values were determined using the ELISA method. Modified group was more accelerated tooth movement than control group ($p=0.032$). In accelerating tooth movement, the newly introduced system was found to be more successful.

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Evaluation of the enamel thickness of anterior teeth and safe preparation depth for porcelain laminate veneers

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The purpose of this study is to determine the safe preparation interval to be made in anterior teeth during application of porcelain laminate veneers. Preparations within the borders of the enamel are more likely to succeed in the long term. For this reason, it is appropriate to determine the enamel thicknesses of anterior teeth and prepare them accordingly. Cone-beam computed tomography images of 117 patients were evaluated to determine the enamel thicknesses of the incisive and canine teeth and to determine the safe preparation interval. Enamel thicknesses of teeth were measured in different levels as cervical, middle, and incisal 1/3. It was also assessed whether the enamel thicknesses were different among the sexes. In addition, it was also evaluated whether there is a relationship between tooth size and enamel thickness. Student *t*-test, Mann–Whitney *U*-test and Pearson tests were used for statistical evaluation using Sigmasat program ($p=0.05$). Bland–Altman plots analysis was used for method error. It was found that the teeth sizes of the males and their enamel thicknesses were higher than females ($p=0.046$). The relationship between the sizes of the teeth and enamel thickness was also determined.

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Prognostic value of free/total PSA ratio in prediction of bone metastases in patient with prostate cancer

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Prostate cancer is the most common cancer among men. Prostate-specific antigen (PSA) is a commonly used tumor marker in the diagnosis and follow-up of prostate cancers. There have been many reports in the literature that free PSA/total PSA ratio is more sensitive than total PSA in the presence of prostate cancer. In this study, we aimed to investigate the prognostic value of free PSA/total PSA ratio in prediction of bone metastases in patient with prostate cancer. For this purpose, the correlation tests performed between bone

scintigraphy findings and some laboratory parameters. The preliminary results of our study show that a very weak correlation (0.111) between the number of bone metastases lesions and free PSA/total PSA ratio in patients with prostate cancer. In addition, we detected a weak correlation total PSA (0.025) and free PSA (0.238) with the number of metastatic lesions. We found also a moderate correlation between bone metastases lesion number with ALP values (0.430) and Gleason score (0.367) parameters. According to this result, free PSA/total PSA ratio was not considered as a reliable parameter in prostate cancer cases following bone metastasis development.

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The role of lipid phase of erythrocyte membranes in ensuring haemoglobin's oxygen-binding capacity during experimental hyperoxia

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Methods of thin-layer and gas-liquid chromatography were applied to research into lipids' phospholipid and fatty acid composition as well as their degree of oxidation during normal conditions and hyperoxia. The values of lipid peroxidation products – diene conjugates and malondialdehyde were determined. The RAMAN spectroscopy was used to study the conformation and haemoglobin's oxygen binding properties. Based on the obtained results, we can draw a conclusion that during hyperoxia lipid composition of erythrocyte membranes is undergoing profound transformation. The revealed changes refer to the polar as well as hydrophobic regions of the phospholipid molecules. Such changes can be attributed to the action of lipolytic enzymes coupled with intensification of oxidative processes that affect the polyunsaturated component of the phospholipids. Apart from that Ca²⁺ ions and various pH values intensify processes related to the disruption of the phospholipid composition. Changes in lipid bilayer lead to impaired oxygen-transport properties of erythrocytes' haemoglobin.

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Nanobiotechnology

Silver ion promotes sodium influx and membrane blebbing growth in U251 human glioblastoma cell line

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Silver cation application (Ag⁺, 10 μM) activates an inward cationic currents (I_{Ag}) at -90 mV in patch-clamp whole cell perforated configuration in U251 glioblastoma cells line. The I_{Ag} was reduced following the replacement of extracellular sodium ion with tetraethylammonium (TEA). Increase of intracellular calcium levels measured by using Fura-2 probe suggest that Ag⁺ induces extracellular calcium influx associated to I_{Ag} current activation. Accordingly, I_{Ag} activation and intracellular calcium increase promotes by Ag⁺ was prevented by co-application of cysteine (20 μM) suggesting a critical role of thiol groups in the biological effects of silver ion. Time-lapse experiments display a rapid morphology change associated to Ag⁺ application with maximum effect in about one hour, characterized by spherical membrane blebbing formation and growth after silver application. Extracellular cysteine abolishes the morphological changes of silver ions. Extracellular sodium ion replacement with TEA or an increase of extracellular tonicity by sucrose (100 mM) also reduced about 50% of blebbing formation after silver application. In conclusion our data suggests that Ag⁺ promotes an irreversible sodium and water influx in glioblastoma cells associated to membrane blebbing as possible consequences of increase of intracellular hydrostatic pressure.

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Biomedical applications of nanodiamond: Interaction with blood *in vitro* and *in vivo*

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The applications of nanodiamond (ND) as drug delivery and bio-imaging can require the relinquishing ND-drug conjugate via blood flow, where interaction with blood may occur. In this work, we studied the interaction of NDs with human RBC's. Laser confocal microscopy was used to observe ND attaching on the RBC membrane. Raman spectroscopy and UV-vis absorption are used to characterize the effect of NDs on the oxygenation and deoxygenation processes of RBC. The interaction of ND of size 100 nm with the tissue-resident murine macrophages, RAW 264.7, as the cellular model. The cytotoxicity of ND for macrophages is analysed using MTT assay. The TNF-α production stimulated by ND is studied *in vitro* at interaction with the RAW 264.7 cells and *in vivo* on the animal model after ND injection in the blood system. It is found ND neither induces macrophage to produce the pro-inflammatory