01 ADSORPTION AND WETTING OF PROTEIN AFFECTED BY BIONIC SURFACE TEXTURE DESIG NFOR ARTIFICIAL ORGANS APPLICATION

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Background Surface texture has been widely used in functional surface design. Protein adsorption on the surface plays an impmtant role in improving biocompatibility of materials for aitificial organs development.
Methods Anay of bionic surface texture was fabricated on the surface of titanium alloy to imitate the surface of artificial organs. Experiments of BSA protein adso rption were perfonned on the different surface textures under stead body temperature of 38 degree centigrade for 4 hours. Property of absorption and wetting were characterized by polarizing microscope, scanning electron microscope and contact angle meter.
Results Results showed that BSA adsorption decreased with the increasing of surface texture depths and ratios, and tended to be stable finally. The wetting property became poorer as the surface texture depths and ratios increased. There was a remarkab le conelation between them. However, High levels of texture depths and density may lead to the negative influence on the tribo logical property of the surface.
Conclusion Bionic surface texture has obvious influence on the adsorption and wetting of protein. Proper parameters of bionic surface texture may be of importance for the surface design in the real specific application.
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02 BRAIN CANCER PREDICTION USING MACHINE LEARNING METHODS AND HIGH-THROUGHPUT MOLECULAR DATA

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Background Glioblastoma multiforme (GBM) is a highly aggressive type of brain cancer with short survival time, poor prognosis and high mortality. Although research based on molecular data plays a crucial role in predicting cancer, few studies have been developed to combine high-throughput molecular data with clinical variables. Our goal is to establish machine learning based models to predict GBM survival.
Methods The molecular data and clinical information of GBM were downloaded from The Cancer Genome Atlas (TCGA) database. The molecular data include somatic copy-number alteration (SCNA) and microRNA. Logistic regression and support vector machine (SVM) were used to establish the predictive models using molecular data, clinical variables and their combinations. Receiver operating characteristic (ROC) was conducted to estimate the sensitivity and specificity.
Results The AUC scores are 0.72, 0.69 and 0.82, respectively using clinical variables, SCNA data and their combinations. The AUC scores are 0.97 and 0.98, respectively using microRNA data and the combinations of microRNA data and clinical variables.
Conclusion Our study developed machine learning based models to predict GBM survival. The combination of molecular data and clinical variables can improve prediction accuracy. Moreover, it also brings us new insights into the molecular mechanisms underlying GBM cancer.
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03 THREE-TEMPLATES MOLECULARLY IMPRINTED SOLID-PHASE MICROEXTRACTION COATINGS FOR PARABENS ANALYSIS IN RIVER WATER SAMPLES

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Background Usually, only one kind of compound is selected as a template molecule in the preparation of molecularly imprinted polymer (MIP). Three-templates molecularly imprinted solid-phase microextraction coatings were designed and used for the selective extraction of parabens in this study.
Methods Methyl p-hydroxybenzoate, ethyl p-hydroxybenzoate and butyl p-hydroxybenzoate were selected as templates to prepare molecularly imprinted solid-phase microextraction coatings. A glass capillary with an outer diameter of 0.3–0.5 mm was selected as a substrate. The thickness of the MIP coating was 0.3 mm. The coatings were used for parabens extraction and then coupled with HPLC analysis.
Results The optimal extraction time was 120 min. The desorption time was 15 min. The best desorption solution was methanol. The three-templates molecularly imprinted solid-phase microextraction coatings showed good selectivity to parabens. The imprinting factors for three template molecules were 1.26, 1.21 and 1.26, respectively. The coatings were successfully used for parabens extraction and then coupled with HPLC analysis in river water samples. The recoveries were between 75.15% and 97.97%. The RSDs were between 0.75% and 10.23%.
Conclusion The three-templates molecularly imprinted solid-phase microextraction coatings can selectively extract three parabens in real water samples.
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04 CONSTRUCTION AND ANALYSIS OF LAIR-1 OVER-EXPRESSED NK-92 CELLS

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Background LAIR-1 can be triggered by collagen and its intracellular ITIMs are crucial for the inhibitory signal to NK cells. In order to investigate the regulation mechanisms of LAIR-1/collagen