Title EN  Dual grid system for laparoscopic assisted brachytherapy guidance for hepatic tumors (with intra-abdominal plastic grid)

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Description EN  The invention relates to a dual grid device used for guiding brachytherapy probes in the treatment of non-resectionable liver tumors assisted by laparoscopy. The system consists of two grids, including an external grid placed on the skin of the abdominal wall and one inserted through the laparoscopic trocar into the abdominal cavity and placed on the liver capsule. The advantages are the use of perforated plastic strips assembled in a square shape, these bands being easily inserted through a 10 mm trocar and assembled inside the abdominal cavity and also disassembled and extracted by trocar laparoscopically.

Class no.

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Title EN  Salivary optical sensor implemented by the lateral coupling of a side-emitting optical fiber and a fluorescent optical fiber integrated into an intra-oral device

This invention refers to a distributed salivary sensor for the detection of salivary compounds (e.g. advanced glycation products), implemented around the optical coupling of a side-emitting optical fiber (1) and a fluorescent optical fiber (2), and integrated into an intra-oral device (4). The sensing technique is based on the fact that the analyte, interposed in-between the two fibers on the sensing area (6), filters the light radiation that is coupled from the side-emitting fiber into the fluorescent fiber and consequently changes the emission spectrum of the fluorescent optical fiber: gain, attenuation or the coupling of new spectral components.

The technical problem solved by this invention is distributed salivary sensing performed with optical means, without the binding step of the analyte using a chromophore. Thus, our invention adopts a label-free sensing technique that exploits the potential of body fluids to alter the spectral parameters of the light coupled from the side-emitting fiber into the fluorescent optical fiber.

Our invention has a preventive role because our goal is to detect the presence of salivary compounds as bio-marker markers of disease, but also a method of dispensarization of patients to evaluate the effectiveness of applied therapies.

**Applications. Advantages.**

The applications of our invention are summarized as: real-time detection of salivary compounds; purely optical sensing of salivary compounds, label-free sensing of salivary compounds, easy integration into an intra-oral device and non-invasive patient monitoring.

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Cytoblock preparations for early diagnosis of premalignant and malignant oral lesions, correlated with ultrasonography of oral mucosa

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Oral cancer is a major health problem due to the difficult diagnosis in early stages as well as the reduced quality of life and the low survival rate inherent in the advanced lesions. In order to achieve a lower morbidity and mortality associated with the oral cancer, it is necessary to optimize the preventive screening for early detection of the suspicious premalignant lesions. Cytoblock preparations correlated with oral ultrasonography could be used complementary to a clinical examination for reliable clinical screening. The aim of this research is to investigate the accuracy of the
histopathological examination based on the cytoblock preparations for the diagnosis of the early stages in oral carcinomas. The histopathological findings will be correlated with the data from the ultrasonographical examination of the oral mucosa.

Epithelial cells exfoliating from the oral mucosa are collected with a Cytobrush, fixed using absolute ethanol, suspended in HistoGel® and included in paraffin to obtain the cytoblocks. Cytoblock preparations using routine hematoxylin-eosin or immunohistochemical stains are microscopically examined to assess various changes in the exfoliated oral epithelial cells.

Point of care ultrasound is increasingly emerging as a field that can be applied in various clinical situations. Oral point of care ultrasound could be performed by primary care physicians in the dental office to investigate unclear findings in the oral-facial area. Ultrasound examinations employing transducers at frequency of 18 MHz and 38 MHz are used for identifying the oral lesions, for measuring their size and for detecting the changes in the adjacent tissues.

Applications. Advantages.
The goal of oral epithelial cells cytoblocks and oral mucosa ultrasonography as novel preventive screening methods is to detect the premalignant or early malignant lesions. The screening is beneficial especially in patients with history of tobacco and alcohol use, who have higher relative risks of developing oral cancer. Cytoblocks and oral ultrasonography are non-invasive methods, feasible for the primary care physicians and a cost-effective option for early recognition of premalignant oral lesions.

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<table>
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<th>Title EN</th>
<th>Artificial dental root and procedure for obtaining it from polylactic acid grafted with mesenchymal stem cells</th>
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The artificial dental root, according to the invention, consists of a porous scaffold made of polylactic acid (PLA) by 3D printing and then grafted with autologous mesenchymal stem cells derived from the adipose tissue (ADSCs) and pre-differentiated towards the bone lineage, which will subsequently produce the bone matrix.

The process for obtaining of artificial dental root grafted with mesenchymal stem cell consist of the following steps:

1. Making a porous dental root scaffold by 3D printing from PLA;  
2. Harvesting of adipose tissue;  
3. Isolation, cultivation, multiplication and characterization of ADSCs;  
4. Differentiation of ADSCs towards the bone lineage and evidence it (PKH26 mark);  
5. Cultivation of ADSCs pre-differentiated to the bone lineage on the PLA scaffold and implantation at the receptor situs level.

**Applications. Advantages.**

By applying the invention, the following advantages will be achieved:

1. Preserving the dimensions of postextractional alveoli by implanting artificial dental roots in these sites.  
2. Postoperative bone resorption is reduced.  
3. The risk of rejection of the graft from the postextractional alveoli is reduced, due to the use of autologous mesenchymal stem cells harvested from the patient; moreover, the matrix used is biocompatible and is resorbable over time.  
4. Creating optimal local conditions for the insertion of future dental implants or for applying the prosthetic works.