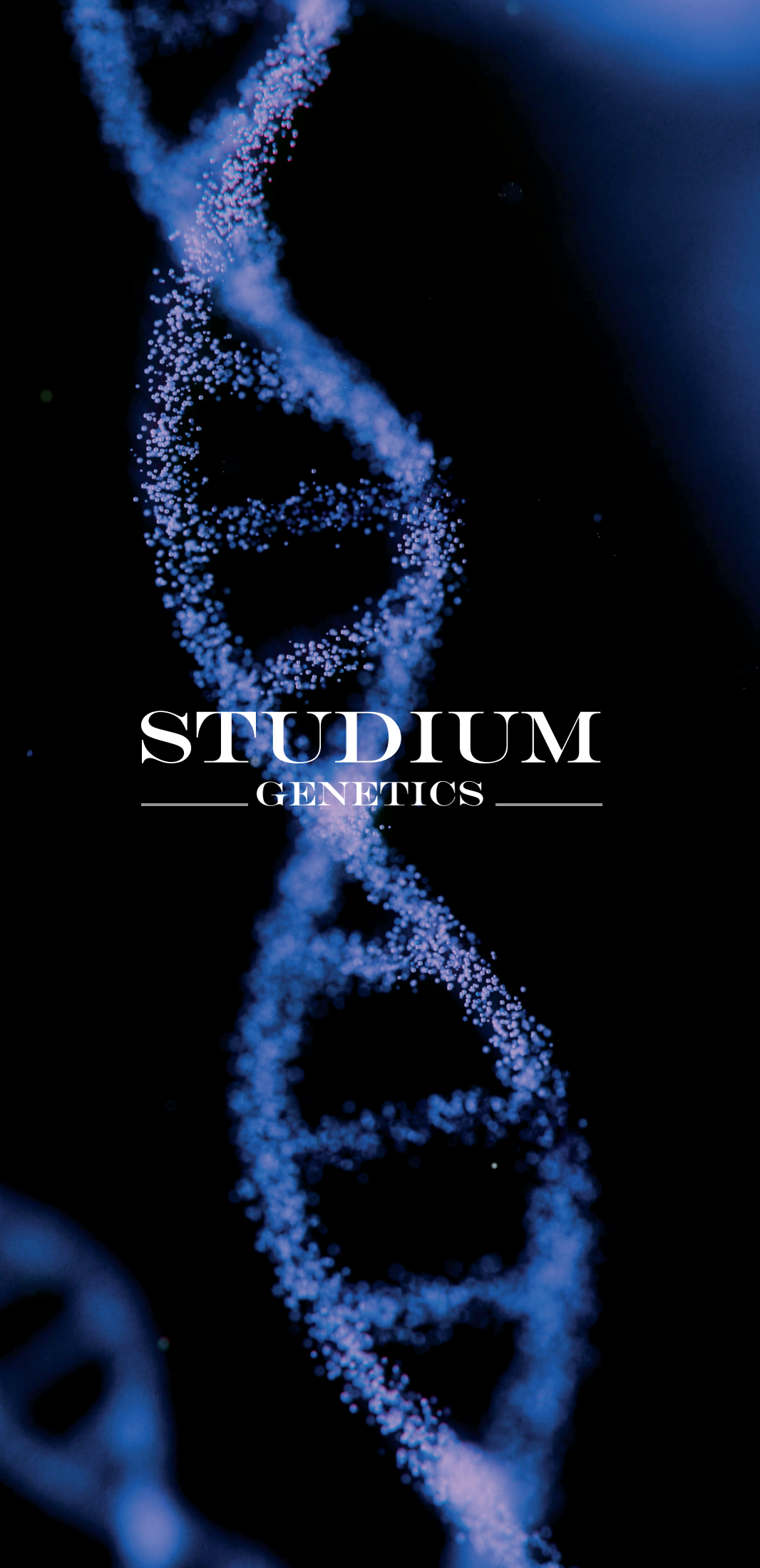

STUDIUM
GENETICS

Studium Genetics

Headquartered in Bologna, Italy, **Studium Genetics** is a spin-off company of **Alma Mater Studiorum – University of Bologna** that develops early diagnosis and prognosis predictive methods in the molecular oncology field, with particular regard to **Oral Cancer**.

Studium Genetics is a company focused on **precision medicine** by a **groundbreaking genomic and epigenetic testing**, which have significantly contributed to improved **diagnostic accuracy and prognostic prediction of cancer, neurological disorders** and common **complex diseases of ageing**.

Epigenetics provides a **molecular explanation** to **bridge the gap between genome and environmental factors** that influence the development of these diseases. The **investigation of DNA methylation alterations** is the **main feature of Studium Genetics**.

Backed by prestigious physicians and institutions, Studium Genetics aims at **shifting the standard of care** towards **more innovative treatments**.

Epidemiology of oral cancer

Oral and pharyngeal cancer, grouped together, are the sixth most common cancer in the world. The annual estimated incidence is approximately 750,000 per year, two-thirds of these cases occurring in developing countries.

Clinical Need

The mortality rates of these tumors have remained unchanged (50% within 5 years after diagnosis) and are mostly related to tobacco smoking and alcohol intake. Oral squamous cell carcinoma (OSCC), which represent 95% or all oral cancers, is usually diagnosed in an advanced stage (stage III and IV), which is associated with worse prognosis and higher radio- and chemotherapy morbidity. If the disease is identified in earlier stages (Stage I or Stage II) the overall five-year survival rate is greater than 80 percent.

Oral cancer is usually diagnosed on the basis of an incisional biopsy that requires a minimally invasive surgical approach, that can create discomfort and can be refused by the patient. The delay of a correct diagnosis impacts on survival rate of these patients because these tumors grow very quickly. Therefore, the development of non-invasive methods to early detect oral premalignant lesions is an attractive strategy to reduce the burden of oral cancer.

Limits of the current diagnostic procedures

Clinical and histological features of Oral Premalignant Lesions (OPML, i.e. leukoplakia, erythroplakia, oral lichen planus) are not able to provide enough information to identify the lesions, leading to a high risk of enduring malignant transformation and develop an OSCC during follow-up. Although the oral cavity is easily accessible for examination, several factors limit the identification and early treatment of OPMLs. For this purpose, the current gold standard for screening and detecting, is the visual and tactile palpation during an extra- and intraoral examination by the healthcare professional in a routine dental or physical examination.

However, this disease is not easy to identify in its earliest stages and has often eluded medical and dental professionals because it can be “occult,” or hidden from plain view. Indeed, normal-looking tissue may often hide the truth within the cells below the mucosa’s surface.

Unfortunately, all too often the manifestations of this invasive and devastating disease are detected in the late stages (Stages III-IV), when the lesions have typically advanced so deeply that it is impossible to treat without radical surgical intervention and significant loss of the patient’s quality of life.

In particular, OSCC is usually diagnosed based on an incisional biopsy. Nevertheless, the incisional biopsy requires a minimally invasive surgical approach that can create discomfort and be refused by the patient.

SG-OCRA™: The Revolutionary Technology

Studium Genetics has developed and patented the Oral Carcinoma Risk Algorithm (SG-OCRA™), a method for the early detection of patients at risk to develop Oral Squamous Cells Carcinoma (OSCC) and its precursor: high grade dysplasia. The innovation is based on quantitative DNA methylation analysis using bisulfite Next Generation Sequencing (NGS) in exfoliating brushes of oral mucosa.

The markers involved in this invention are a set of 13 genes in which the aberrant methylation pattern is indicative of severe dysplasia and/or OSCC.

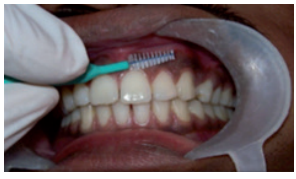
The DNA methylation analysis of these 13 genes allows to calculate a score using an internally developed and patented algorithm to identify those patients at risk for oral cancer.

SG-OCRA test performance: Sensitivity: 97%; Specificity: 88%; PPV: 89%; NPV: 97%

The Studium Genetics SG-Oral Collection kit allows to store the specimens at **room temperature**; the preservation solution **eliminates cold-chain and ensures DNA/RNA stability** during sample transport at ambient temperatures.

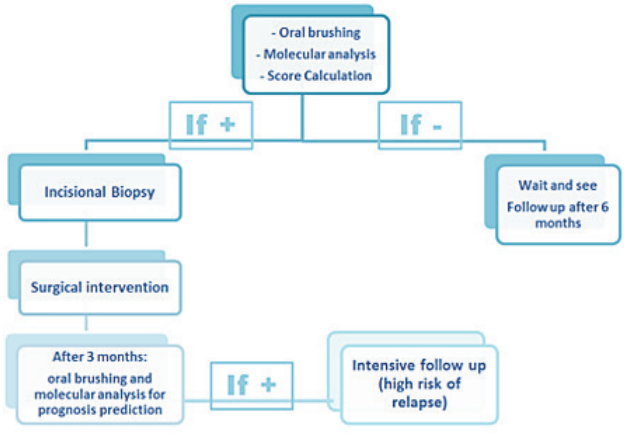
Test Target for early Diagnosis

This test is targeted to those patients who are at high risk to develop an OSCC. High risk patients are heavy smokers and alcoholics and patients with Oral Premalignant Lesions (OPML) detected by dentists, maxillofacial surgeons, otolaryngologists. The most common forms of OPML include leukoplakia (OL), erytroplakia and oral lichen planus (OLP), as defined by WHO. OL is defined as a white patch or plaque that cannot be characterized clinically or pathologically as any other disease. It has a comprehensive global review point at a prevalence of 2.6% and malignancy conversion rate ranging from 0.1% to 17.5%. OLP is the consequence of a chronic cell-mediated immune condition of unknown etiology. The reported annual malignant transformation rate is probably less than 0.5% for OLP. Erytroplakia has a transformation rate of 70-80%.



• Oral brushing specimen collection detecting premalignant lesion and OSCC for early screening
• Oral brushing specimen collection evaluating field cancerization in surgically resected patients for prognosis

• Bisulfite Next Generation Sequencing (NGS) of 13 genes
• Quantitative DNA methylation analysis and calculation of discriminant score by a proprietary algorithm (Patent pending)



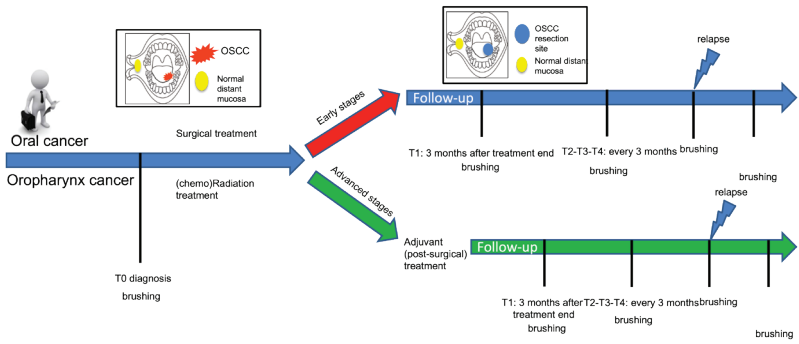
Test Target for Prognosis

Oral Squamous Cell Carcinoma (OSCC) showed a significant risk to develop local recurrences or second primary tumors during follow-up. This Technology demonstrated a prognostic value investigating the adjacent area of surgical resection in a series of OSCC during follow-up.

Oral brushing specimens should be collected in the surgical area after OSCC treatment and samples will be enrolled during routine follow-up visits after primary OSCC cancer treatment, at least 3 months after OSCC surgery.

If the specimen showed a positive score indicating an altered epigenetic pattern related to the presence of a field cancerization effect, the patient will be at high risk to develop a recurrence and it should be treated more aggressively.

BRUSHING TIMELINE



Unique

High sensitivity while being **not invasive**

Based on high precision bisulfite-Next Generation Sequencing method

The **specimen can be delivered at room temperature**, thanks to preservation solution

Provides **diagnostic and prognostic information**

Detect **tumors at an early stage, enabling day hospital** services for **surgical intervention**, thus reducing the tumor burden and improving quality of life for patients

Fast and cheap protocol, ideal for **screening programs**

It early detects patients who are at high risk to develop a recurrence

No alternative technology currently exists in the market for OSCC early detection.

Despite **a number of different approaches have been tested in the past** (e.g. exfoliative cytology, optical diagnostic method etc.) **none of them** has been **validated in clinical samples and implemented in clinical practice**.

The patented method will be made available from June 2023 to the public, patients and healthcare professionals.

Contact Us
Studium Genetics S.r.l.

PHONE
+39 051 032 1925

EMAIL
info@studiumgenetics.com

ADDRESS
via F. Petrarca 2
40136 Bologna - Italy

WEBSITE
www.studiumgenetics.com