



## **Beyond TNM staging system stratification in oral cancer patients: the OraMod project implements SNB technique**

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### **Abstract**

#### **Background**

The OraMod project (ICT VPH based predictive model for oral cancer, 7th Framework Program, CE) focuses on the generation and implementation of multiparameter prognostic models using clinical, histological, radiological and genomic markers, to predict: 1) reoccurrence, 2) survival, and 3) N stage. Focusing on objectives 1 and 2, the current post-treatment risk stratification of patients is according to pTNM staging. However, the TNM system shows limitations due to its simplicity for everyday clinical practice. This indicates the possibilities to improve the TNM system with additional information generated from clinical, pathological, radiological and genomic analysis.

Adequate management of the clinically N0 neck is still a major controversy in head and neck oncology. When the tumor has metastasized to the regional lymph nodes in the neck, the neck should be treated, and approximately 30-40% of the patients with oral cancer at stage I/II have occult cervical disease undetectable by current imaging techniques. One of the more promising approaches for staging of the cN0 neck is sentinel lymph node (SLN) biopsy. The SLN is by definition the first lymph node to which the primary tumor drains via the lymphatic system, and its histological analysis reveals the presence of regional metastasis and determines whether the neck should be treated.

## **Aims:**

The OraMod project aims to generate and validate multiparameter prognostic models to aid treatment decisions and to improve the staging of the clinically N0 neck. In addition, these models will be integrated in an ICT environment to support clinical implementation.

## **Materials and Methods:**

Prognostic gene sets were identified from microarray profiling studies, and independently validated by RT-qPCR. A dedicated Imaging Processing Tool was developed for semi-automatical extraction of imaging features. Multiparameter risk models were built using these imaging features, RT-qPCR data, histological and clinical data .

In parallel OraMod a 3D non-invasive solution to identify SLNs based on SPECT-CT images was developed.

## **Results:**

Univariate and multivariate statistical methods were used to select 40 genes predicting outcome, and 20 genes predicting N stage. Genes were tested by RT-qPCR on an independent patient cohort. Multiparameter prognostic models were generated using clinical, histological, imaging and RT-qPCR data, and were significantly more accurate when compared to pTNM. To predict pretreatment N-stage both clinical, RT-qPCR data and imaging models were analysed, separately and in combination. These first preliminary results of the OraMod Project will be presented.

## **Conclusion:**

Although still preliminary, the results of the OraMod studies indicate that multiparameter prognostic models of other variables than those in TNM staging, outperforms prediction for both N-staging and outcome.



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