

qMIDS: A Non-Invasive Molecular Stratification Platform for Rapid OSCC Detection

quantitative Malignancy Index Diagnostic System V3 (qMIDS^{V3})

A novel qPCR-based diagnostic test for detecting oral cancer risk and predicting patient prognosis. qMIDS^{V3} is a low cost, rapid, non-invasive test to distinguish OSCC from low-risk OPMD and contralateral normal mucosa with high diagnostic sensitivity.

Background

Oral squamous cell carcinoma (OSCC), the most common form of head and neck cancer, is often preceded by oral potentially malignant disorders (OPMDs), a group of lesions with varying risks of progression to cancer. While only a minority of OPMDs become malignant, current diagnosis relies on invasive surgical biopsy and subjective histopathological assessment, which can be uncomfortable for patients and may not reliably identify high-risk lesions. Because OPMDs are often large or multifocal, traditional biopsy approaches may also fail to capture areas undergoing malignant transformation.

The qMIDS platform was developed to address this unmet clinical need. qMIDS^{V3} uses a panel of 4 cancer-associated genes and a proprietary algorithm to generate an objective malignancy score, enabling risk stratification and early detection of oral cancer. Combined with minimally invasive brush-biopsy sampling, qMIDS has the potential to improve diagnostic accuracy, support long-term surveillance, reduce unnecessary procedures, and facilitate earlier intervention for patients at greatest risk of developing OSCC.

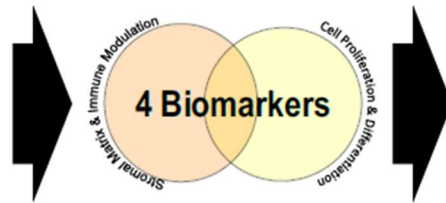
The Problem

- >10 million global OPMD cases/year creating a significant healthcare burden.
- Current diagnosis requires a large biopsy, taken during a highly invasive surgical procedure.
- Diagnosis is subjective and dependent on the experience of the pathologist.
- Pathology cannot differentiate between low and high-risk OPMDs.
- There are currently no biomarkers for differentiating OSCC from OPMDs.

Invention: Benefits & Application

qMIDS^{V3} is a novel, non-invasive molecular diagnostic test for the early detection of OSCC and risk stratification of OPMDs. Using a simple brush biopsy and proprietary multigene expression analysis, qMIDS^{V3} generates an objective malignancy score that can rapidly identify patients requiring further investigation while avoiding unnecessary invasive procedures for low-risk individuals. qMIDS^{V3} has the potential to transform oral cancer surveillance and diagnosis, reducing healthcare costs, improving patient experience, and enabling earlier cancer detection.

Non-Invasive Brush Biopsy



qMIDS Oral Cancer Test

$$MI = \sum_{i=1}^n \left[\log_2 \left[\frac{T(T_{nm})}{T_m(T_n)} \right] \right] \cdot \log_2 [Q_4(Q_3 - Q_1)]$$

Project Development

The qMIDS^{V1} diagnostic test was first validated using UK and Norwegian micro biopsy (1mm) tissue samples, and subsequently validated in China using ethnic Han Chinese specimens. The validation process led to the collection of over 24,000 data points, which allowed further refinement of the biomarker panel. Development of a second iteration of the test called qMIDS^{V2} followed.

An international multi-cohort study validating the qMIDS^{V2} technology in 535 patients from UK, China and India was recently published. qMIDS^{V2} demonstrated highly comparable results amongst the three ethnically and geographically diverse cohorts. Test performance results are tabulated below:

OVERALL TEST:		UK	China	India
Sensitivity:	TP/(TP+FN)	88%	88%	97%
Specificity:	TN/(TN+FP)	96%	91%	86%
Accuracy:	(TP+TN)/Total	92%	89%	93%
Sample Size:	(n)	282	35	95

The 3rd generation [qMIDS^{V3}](#), has recently been validated in one of the largest prospective case-control study involving over 1000 non-invasive oral brush biopsy samples test capable of detecting oral cancer within an hour. qMIDS^{V3} distinguished OSCC from OL and OLP with AUC 0.975, sensitivity 95.7%, specificity 52 95.1%, and overall accuracy 95.5%. False-positive and false-negative rates were 4.9% and 4.3%, 53 demonstrating high specificity for detecting malignant cells rather than premalignant or inflammatory lesions.

Inventor

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qMIDS^{V3} Website: <https://sites.google.com/view/qmids/home>

Patent

A patent claiming the use of qMIDS^{V3} for cancer diagnosis has been filed. Queen Mary Innovation are now seeking partners who would be interested in licensing this technology for commercial development.

qMIDS^{V2} Patent Application Number: WO 2021/013891

qMIDS^{V3} Patent Application Number: GB 2512759.8

Publication

1. Teh, M.T., et al., INHBA–S100A16 dysregulation enables a non-invasive molecular stratification platform for rapid detection of oral squamous cell carcinoma: results from a large diagnostic case-control study. *Biomarker Research* **2026**, 14:76, DOI: 10.1186/s40364-026-00963-7
2. Teh, M.T., et al., Molecular Signatures of Tumour and Its Microenvironment for Precise Quantitative Diagnosis of Oral Squamous Cell Carcinoma: An International Multi-Cohort Diagnostic Validation Study. *Cancers (Basel)* **2022**, 14, DOI: 10.3390/cancers14061389.

