FACULTY OF MEDICINE AND HEALTH SCIENCES

MOLECULAR-SPECIFIC OPTICAL GUIDED SURGERY IN HEAD AND NECK SQUAMOUS CELL CANCER, A SYSTEMATIC REVIEW OF ANIMAL MODELS AND CLINICAL TRIALS.

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BACKGROUND

Because of its important role in oncological curation, surgical oncology has radically advanced over the last decades with new techniques and technological improvements resulting in better outcome and survival in cancer patients. However, one prominent risk factor remains the complete removal of the solid tumor with acceptable margins. In head and neck cancer, when tumor cells remain present in the patient postoperatively, a significantly lower chance of curation is described and these patients are hence referred for further adjuvant therapies. This has led to the recent development of intra-operative optical guidance to visualize the tumor margins by use of fluorescence. The field of optical guided surgery has evolved tremendously over the last couple of years, resulting in an explosion of different tracers. This sudden growth of optical guided surgery has led to an unclear overview of the tracers used in the field. The current systematic review aimed at systematically collecting all different molecular specific probes studied in animal models and clinical trials for their application in the optical visualization of head and neck squamous cell cancer specifically.

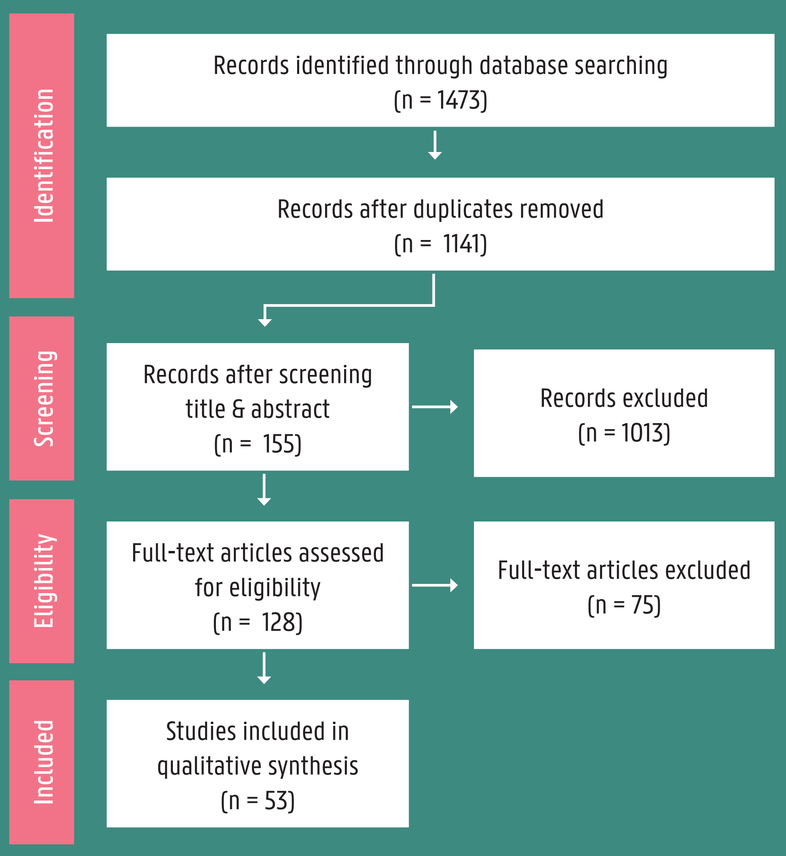
RESEARCH QUESTION

1 Which tracers have been used in (pre)clinical (animal) studies to investigate the use of optical-guided surgery in mucosal head and neck squamous cell carcinomas (HNSCC)?
2 Which tracers have had positive/negative results and should (not) be utilized in further research?

METHODS

Databases used: Medline, Web of Science & Embase
Included:

- Molecular specific probes for macroscopic identification
- Mucosal squamous cell cancers of the head and neck in
- Animal models or clinical trials



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RESULTS

TARGET	NUMBER OF STUDIES
CD44v6	2
COX-2	1
EGFR	21
EpCAM	1
Folate Receptor	1
GGT	2
Integrins	6
Cathepsin and MMP	7
PARP	2
Podoplanin	1
Transferrine	1
uPAR	2
VEGF	1

A total of 53 studies analyzed macroscopic fluorescent probes for the detection of HNSCC.

- 49 preclinical trials
- 4 clinical trials using anti-EGFR antibodies

CONCLUSION

The current review collects all (pre-)clinical manuscripts discussing the use of fluorescence-labelled antigen guided surgery patients or animal models with squamous cell carcinomas of the head and neck. The epidermal growth factor receptor is the most analyzed antigen in preclinical studies, and is the only antigen that made it to clinical trials at the time of writing. There are however multiple different antigens described on HNSCC with equivalent preclinical results. Future research should further focus on improving the antigen sensitivity and specificity by comparing the multiple antigens in different cell types.

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