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Advancing surgical guidance: from (hybrid) molecule to man and beyond

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STELLINGEN BEHORENDE BIJ HET PROEFSCHRIFT

“ADVANCING SURGICAL GUIDANCE: FROM (HYBRID) MOLECULE TO MAN AND BEYOND”

1. Hybrid tracers have the potential to bridge the gap between preoperative imaging findings and the intraoperative situation. This thesis.
2. Optical identification of the sentinel node(s) using the fluorescent signature of the hybrid tracer is superior in comparison to blue-dye based sentinel node visualization. This thesis.
3. The future of the hybrid surgical guidance approach does not only depend on the generation and availability of (hybrid) tracers, but also on the availability and sensitivity of the imaging modalities used. This thesis.
4. Intraoperative multispectral fluorescence imaging may be used to create an multicolor, anatomical, roadmap to better guide the surgeon towards diseased tissue, while sparing healthy tissue, which can result in improved functional- and oncological outcome. This thesis.
5. The four major interventional opportunities for molecular imaging are, first, to provide guidance to localize a target; second, to provide tissue analysis to confirm that the target has been reached; third, to provide in-room, post-therapy assessment; and fourth, to deliver targeted therapeutics. Solomon and Conrnelis, J Nucl Med 2016;57:493-496.
6. For multimodawlity imaging, modalities are chosen to furnish synergistic, complementary, or clinically useful information beyond that provided by any individual method. Adapted from Culver, Akers and Achilefu. J Nucl Med. 2008;49:169-172.
7. It will take a large multi- and interdisciplinary team consisting of experts with diverse training backgrounds, such as chemists, biologists, pharmacologists, electrical engineers, mathematicians, and treating physicians, working efficiently hand in hand with regulators to make the successful translation of molecular imaging methods into the clinics a reality. Adapted from Kircher and Willmann. Radiology. 2012;264:349-368.
8. Displaying (intraoperative) imaging information in an accessible, easy to comprehend fashion to the surgeon will facilitate adaptation of the image guidance method in the clinic. Adapted from Mondal et al., Adv Cancer Res. 2014;124-171-211.
9. Je kunt beter ten onder gaan met je eigen visie dan met de visie van een ander. Johan Cruijff (1947-2016).
10. Nothing is impossible, the word itself says “I’m possible”. Audrey Hepburn (1929-1993).
11. Too much agreement kills a chat. Eldrige Cleaver (1935-1998).
12. The important thing in science is not so much to obtain new facts as to discover new ways of thinking about them. William Lawrence Bragg (1890-1971).

Nynke S. van den Berg

Leiden, 10 november 2016