# Spotting colon cancer early with the 'Google Earth of colonoscopies'

October 8 2021

Credit: AI-generated image (disclaimer)

A new optical imaging system in the works could revolutionize the diagnosis of colon cancer. Currently, colonoscopies only manage to detect 39 % of bowel cancer cases in the early stages. Now, the EU-funded PROSCOPE project's novel screening platform has the potential to save up to half of the 160 000 lives lost in Europe every year because

of this disease.

Today's colonoscopy procedures are based on white light video or optical narrow-band imaging. They have limited ability to spot different types of cancerous and pre-cancerous lesions early. "It is tough to discriminate serrated lesions from hyperplastic polyps," notes project head Dr. Peter Andersen of PROSCOPE coordinator Technical University of Denmark in a news item posted on Photonics21.

The new approach combines conventional white light in a camera with more advanced photonics and optical imaging tools—optical coherence tomography (OCT), multi-photon microscopy and Raman spectroscopy—for a clearer, more sensitive and deeper analysis of bowel tissue. "A good analogy for our imaging concept is like the Google Earth of colonoscopies: we start with a map of the country and then zoom into a town, then a street, then a building," explains Dr. Andersen. "Similarly, our imaging procedure starts with conventional white light to identify a suspicious area a clinician would like to inspect further. Next, we can zoom into the depth of the lesion using first OCT, then multi-photon microscopy for metabolic information, and finally Raman spectroscopy for molecular information (almost a molecular fingerprint of cancerous cells) to assess the suspected lesion."

Colon cancer is the second leading cause of cancer-related deaths in Europe. Thankfully, survival rates rise dramatically when it's caught early, which is why it is important to spot lesions as early as possible. "Success in this aspect relies on ongoing and reinforced continued research in lasers and photonics across Europe; results that translate into further improvement of diagnostic capabilities," observes Dr. Andersen.

## An all-in-one, label-free tool

The senior researcher goes on to describe the new platform's

capabilities: "Cancerous cells have a higher metabolism than the adjacent, non-cancerous cells, implying higher blood flow and vessel growth surrounding suspected lesions. Once zoomed in on a lesion at the cellular length scale, we can measure blood flow, metabolism and molecular-specific information to identify cancerous lesions at cellular resolution. Our technology is, for the first time in colon inspections, an all-in-one device and, most importantly, label-free, meaning we do not have to inject a patient with dyes or biomarkers to flag up something suspicious."

Lack of awareness and negative attitudes regarding colonoscopies currently hinder early detection of the disease. According to Dr. Andersen, only 14 % of the EU population undergo screening at present. "With early intervention, we could do so much more, save more lives and reduce healthcare costs," he concludes, describing the project as "a crucial step in this journey to tackling this disease." PROSCOPE (Point-of-care instrument for diagnosis and image-guided intervention of Colo-Rectal Cancer) plans to conduct clinical trials at project partner Medical University of Vienna before it concludes its work at the end of 2023.

**More information:** PROSCOPE project website: www.proscope-h2020.eu/

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