Can light help us diagnose prostate cancer?

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Prostate cancer facts for England:
- Every hour one man dies from prostate cancer
- More than 100 men are diagnosed with prostate cancer per day
- 1 in 8 men between the ages of 60 and 80 suffer from the disease
- Many men die with prostate cancer but not from it

How can Deep Raman help in prostate cancer diagnosis?

What is Raman spectroscopy?
When a near-infrared light beam of a specific wavelength interacts with matter (e.g., cells, tissue, materials, etc.), a small fraction of the photons is scattered with a slightly different wavelength (Raman scattering).

This is due to the various ways that different molecular bonds in tissues vibrate. These vibrations are the fingerprint of every molecule.

What is Deep Raman?
Deep Raman is a new concept of Raman spectroscopy where the scattered light is being collected from the other side of the sample (transmission Raman) or on the same side but far away from the excitation point (SORS). In that way signal is collected from a greater volume of the sample rather than a small spot.

Why is Deep Raman so promising?
- In contrast to the conventional Raman microscopy which can "see" up to a depth of only a few hundred micrometres (10^4 m), Deep Raman is able to measure beyond a depth of 2.7μm within non-transparent samples, making the in vivo application a real possibility.
- Deep Raman uses a harmless wavelength of light (near-infrared), making the diagnosis SAFE and complication-free for the patient.

Current applications of Deep Raman
- Pharmaceutical analysis
- Security check
- Bone disease diagnosis
- Quality control
- Testing animal tissue
- Measuring liquid prostate tissue phantoms
- Getting closer to in vivo diagnosis

Potential prostate cancer diagnosis using Deep Raman approach:
(a) SORS and (b) transmission mode