

New, robust and inexpensive technique for protein analysis in tissues

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A new technique to study proteins, which does not require advanced equipment, specialized labs or expensive reagents, has been developed at Uppsala University, Sweden. The technique could be further developed to be used in point of care devices, for instance for diagnostic purposes.

The possibility to identify and localize proteins in tissues is essential for understanding disease mechanisms and for diagnostics. However, today very advanced instruments are often needed to study proteins and how they interact with each other. An example is the microscopy technique that was awarded last year's Nobel Prize in chemistry; super resolution fluorescence microscopy.

Such equipment is expensive to purchase and often requires special training to handle. In order to use [protein](#) detection for diagnostic purposes, e.g. in a clinic, new, less complicated methods to study proteins are needed. Such methods should be temperature insensitive and not require expensive instruments, costly reagents or specially trained staff.

In the most recent issue of the journal *Nature Communications* the researchers present a technique that could be used by for instance hospital staff, to detect relevant proteins. The technique is based on the binding of antibodies, either to two sites on the same protein or to two proteins that are localized very close to each other. The antibodies have been linked to DNA strands that will attach to each other if they are close enough. When this happens a [chain reaction](#) will start in which

increasing numbers of DNA strands are attached. To each DNA strand a fluorescent substance has been linked, which will emit light when it is irradiated with light of a certain wavelength.

" When the chain reaction has run for a while enough fluorescent molecules have been incorporated to allow us to observe them as very bright dots in a microscope, reflecting the presence of a protein of interest. The more dots there more protein", says Ola Söderberg, who has developed the technique together with Masood Kamali-Mogaddam and their research teams.

The chain reaction does not include any enzymes, which means that it can take place at room temperature. The microscopes needed to study the bright dots are relatively simple and commonly available in hospital and research labs. Since two antibodies are bound in the first step "false" signals can be avoided, making the reaction very specific for the studied protein.

" All this implies that our technique can be used as a robust and inexpensive method to localize proteins in tissues. We hope that it soon can be used both for clinical applications and for research purposes", says Ola Söderberg.

The technique has been developed in collaboration with researchers in Uppsala, Scotland and Austria. The results have been published online in the journal *Nature Communications*.

More information: Proximity Dependent Initiation of Hybridization Chain Reaction, *Nature Communications*, [DOI: 10.1038/ncomms8294](https://doi.org/10.1038/ncomms8294)

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