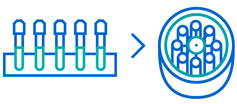
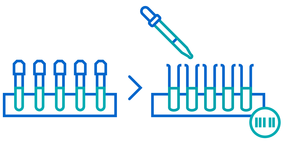
How antibody tests help to detect those already infected with SARS-CoV-2

1. The **human blood sample** is taken and sent to the **lab for analysis.**



2. **Trained lab professionals** prepare the sample. First the **red blood cells are separated to obtain serum/plasma** through centrifugation.

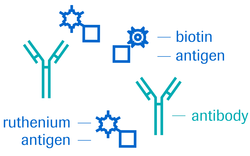


3. Small amounts of serum/plasma are **pipetted into a special sample tube.** To ensure correct identification and traceability each tube carries a **unique barcode.**

4. The tube is **loaded onto a fully automated analyser.** The system begins the identification of antibodies in the sample.

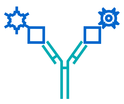
3 reagents are used to process a reaction. Reagents are complex mixtures of biochemicals. The manufacturing of quality reagents at industrial scale is technically demanding.

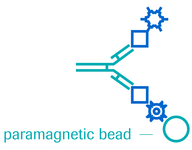
An antigen, like SARS-CoV-2, is a molecule or molecular structure that triggers an immune response resulting in antibody production.



4a. The sample is incubated with a mix of **laboratory synthesised reagents.** One contains a SARS-CoV-2 specific antigen carrying a **“biological bulb”** (ruthenium-label) and another contains a SARS-CoV-2 specific antigen equipped with a **“biological anchor”** (biotin-label).

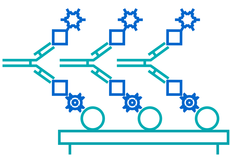
4b. **If SARS-CoV-2 antibodies** are **present** in the sample, a **double-antigen-sandwich** complex is **formed.**





4c. The **sandwich complexes** are attracted via the biological anchor onto **paramagnetic beads.**

4d. These complexes enter the measuring cell of the analyser. A current is applied to an electrode, consequently **it becomes magnetic.** All **paramagnetic beads** carrying the complexes **get bound to the magnetic surface.**



Electrochemiluminescence (ECL) is a kind of luminescence produced during electrochemical reactions in solutions.

4e. Now the detection takes place. A **special solution** is added and the **biological flashlight turns on.** The **light indicates** the presence of **Anti-SARS-CoV-2 antibodies** in the sample.

5. Lab professionals **analyse, control** and **approve** the **test results** before they go into the computer based lab information **system.**

6. These **results** are made available to the **healthcare provider** to enable more **informed decisions.**