

Lateral flow design

Considerations for membrane selection



Lateral flow immunoassays are rapid, convenient tests used to detect target analytes, such as macromolecules and proteins, in liquid samples.



The nitrocellulose membrane is the heart of the lateral flow test. Since the interaction of the assay components influences the outcome of the test, the membrane properties must be considered before selection to improve assay consistency and reproducibility.

Key considerations

Capillary flow time

The shorter the time it takes for a liquid to migrate along the membrane surface, the "faster" the membrane. However, a longer migration time can sometimes enhance sensitivity and specificity, as it allows more time for sample to interact with test line(s).

Sample liquid viscosity

The sample liquid viscosity affects the capillary flow rate and therefore the test duration. Selecting a membrane with a faster capillary flow will therefore help to overcome a long test duration or higher sample viscosity.

Membrane surfactant compatibility

Membrane surfactants make the membrane hydrophilic and help target proteins bind, but partial denaturing of proteins can also destroy antigen binding sites making them unusable. It is good practice to evaluate different membranes and their surfactants for performance with specific molecules and reagents.

Kinetic properties

It is important to consider the kinetic properties of capture reagents. For example antibody affinity depends on the on-rate (the rate at which a target binds to the antigen binding site) and the off-rate (the rate at which an antigen is released from its binding site), therefore antibodies with high on-rates should be used for lateral flow rapid tests.



Membrane types in the Whatman filter portfolio

Backed membrane for most hydrophobicity

The FFHP membrane is our **most hydrophobic** membrane with a consistent **specification batch to batch**.

Backed membrane for high consistency

The same product family as our FFHP membrane, but with **increased surfactant content** to help alleviate any hydrophobicity issues during development. Very **high product consistency** both within and between lots.

Backed membrane for swap-out

The FFHP Plus membrane is **less hydrophobic** but provides the **same high levels of consistency** as the FFHP membrane.

Our FFHP Plus Thick membrane is manufactured to a thicker specification for **easy replacement of membranes in already developed lateral flow assays**.

Backed membrane for rapid rewetting

Immunopore membranes allow **rapid rewetting** and **low background signal**. It's **post treated with surfactant**, so **structurally different** to the FFHP membrane family.

Backed membrane for viscous samples

The Prima membrane has **superior sensitivity** and **faster wicking rates**, this membrane is optimized for the **fastest and most difficult (viscous) assays**.

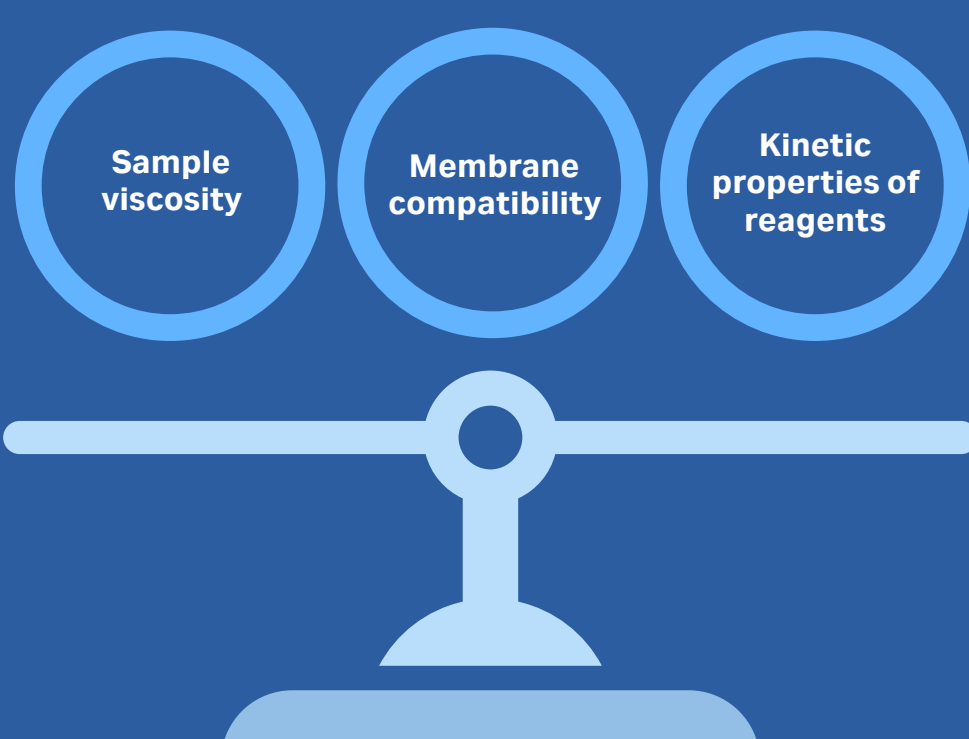
Unbacked membrane for experienced users

The AE membrane is ideal for **experienced users** looking for a **high purity** but **lower-cost membrane**.

Finding the right balance

The membrane should provide sufficient protein binding whilst minimizing the level of non-specific background so that results are easy to interpret. Membrane properties and reagent properties are not independent of each other and can influence the outcome of a test development.

Factors that affect the interaction between sample and the membrane:



[Learn more](#)