Optimer® binders offer the highest batch consistency for reliable reproducibility

In the age of the reproducibility crisis, working with affinity tools that offer the highest batch consistency is critical for the development of robust assays and reliable data. Optimers, as chemically synthesised ligands, deliver the best batch-to-batch consistency for data reproducibility.

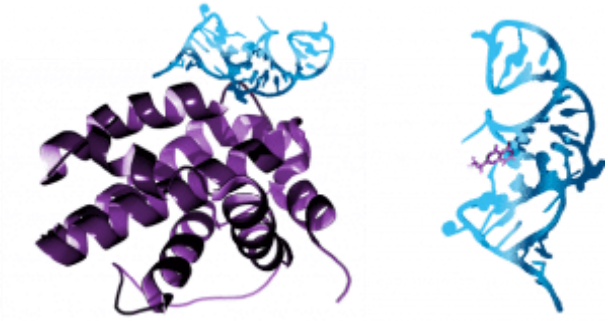
> ***"Once we established the methods for working with the Optimer binders on our biosensor they showed far more reproducible behaviour than typical antibodies."***
> - Prof. Steven Johnson, University of York

Why is reproducibility important?

Reproducibility is essential to foster robust, credible research and to promote scientific advancement. Reproducible data means that the results can be relied upon to be the same every time that the assay is performed by you or anyone else and allows conclusions to be drawn from your research.
A key aspect of reproducibility when working with affinity ligands, whether aptamers or antibodies, is the batch consistency of these tools. Changes in the affinity ligands themselves through variations in production could impact on their performance, meaning different batches of your Optimer or antibody could give different results. This makes product consistency and quality critical for reproducible data generation and the longevity of your work, allowing you to optimise once and maintain performance and data credibility long term.

What are aptamers?

Aptamers are DNA or RNA based molecules that specifically bind to a target analyte. These single stranded oligonucleotide molecules fold to create specific 3D shapes that interact with their target in the same way as antibodies.



Single-stranded oligonucleotide aptamers from 3D structures that allow specific binding to protein (left image) or small molecule (right image) targets.

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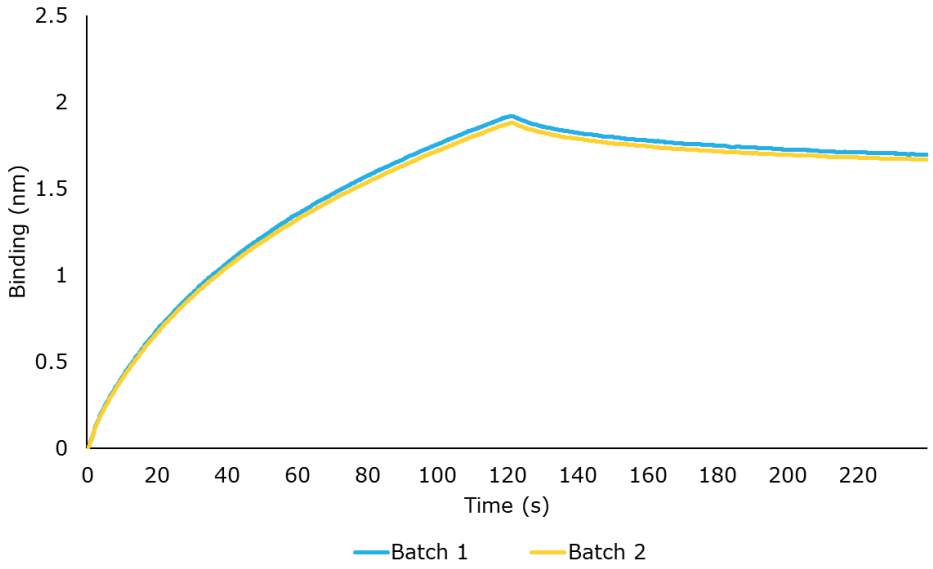
Validated reproducibility with Optimer binders

We have analysed multiple batches of our next-generation Optimers to various targets to determine the reproducible nature of these ligands.

Reproducible Optimer binding for COVID-19

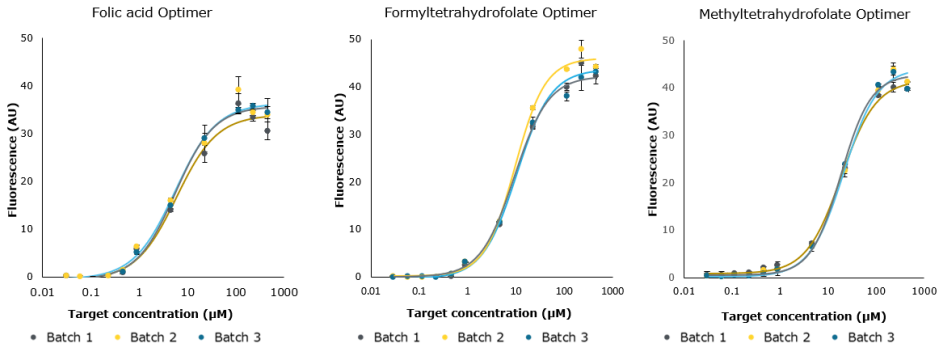
Two separate batches of the COVID-19 S1 Optimer were analysed by biolayer interferometry (BLI) using the Octet Red 384 system. Minimal variation can be seen between the performance of the two batches in binding the S protein from SARS-CoV-2.



SARS-CoV-2 S1 Optimers show batch-to-batch consistency for reproducible results.
BLI streptavidin probes were coated with two separate batches of the biotinylated S1 Optimers at 20 nM and the binding interaction assessed against 500 nM of the SARS-CoV-2 S protein trimer.

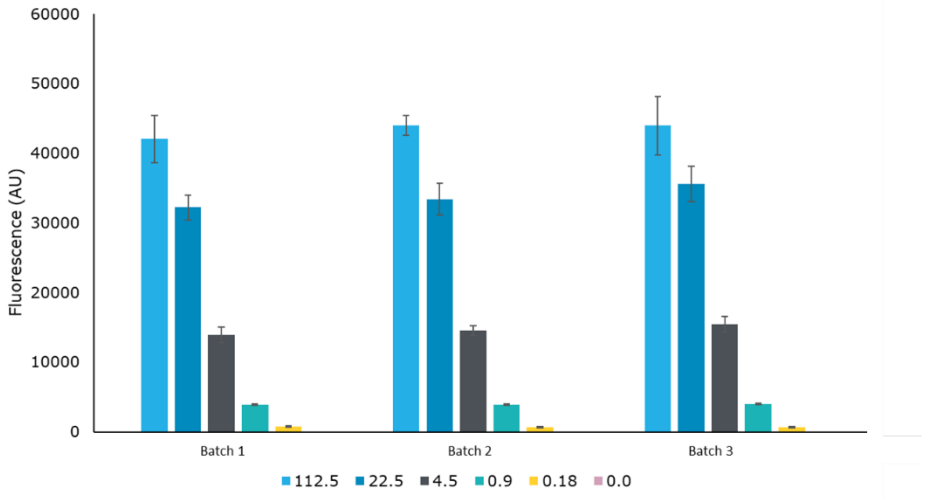
Optimer binders for reproducible folate analysis

Optimers specific to the natural folates were developed to support analytical and affinity purification applications. The performance of three separate batches was evaluated via ELISA-like assays to their specific targets, showing excellent reproducibility across the quantifiable range of the assay for all three Optimers.



Optimers to folate metabolites show reproducible analysis over multiple batches.
Three separate batches of aptamers to each of folic acid, formyltetrahydrofolate and methyltetrahydrofolate were analysed across the quantifiable range showing highly reproducible performance by ELISA-like assay.

Optimer binders for reproducible analysis of stress hormones
Optimers were developed to cortisol with the potential to improve diagnostic accuracy and sensitivity. The performance of three separate batches was evaluated via ELISA-like assay, revealing highly reproducible performance for all batches at each concentration tested.



***Optimers to cortisol show reproducible analysis over multiple batches**. Three separate batches of aptamers to the cortisol stress hormone were analysed across the quantifiable range showing highly reproducible performance by ELISA-like assay.*

Irreproducible data costs millions and kills projects.

There are multiple reports of irreproducible antibody studies due to batch consistency issues. (Examples can be found here, here, here and here). Without reproducible affinity ligands, project timelines may be missed due to extensive batch-to-batch standardization procedures or the requirement for new reagents to be developed mid-project. To overcome this reproducibility issue, save millions in research and development costs, and help improve the translation of research to the clinic, we recommend starting your project with the most consistent affinity ligands possible.

Why are Optimer binders so consistent?

Unlike antibodies, Optimers are chemically synthesised using established processes. This ensures the highest batch to batch consistency. Optimers are defined by their sequence, meaning new batches are synthesised according to this sequence template and so will always be the correct sequence and the same every time.
Recombinant antibodies are similarly characterised according to their sequence and expressed in host cells, for high yields. However, the high number of culture operating parameters for these complex biological expression systems, such as temperature, gas flow, pH, osmolality, metabolite levels, cell concentrations, cell viability and mitochondrial activity, are still not fully understood and small changes during culture can result in significant product variation.
In comparison, monoclonal antibodies produced from hybridoma cell lines which are still widely used by researchers and diagnostic developers are not characterised in this way and can experience genetic drift. This results in variations to the antibodies being produced by the cells and changes their binding and performance. Over time the number of changes in these lines can increase and expression can fail, or the resulting antibodies can increase in cross-reactivity or stop binding to the intended target.

For confidence in your consistency and reliable reproducibility consider Optimers for your future projects.

Get in touch to find out more: info@aptamergroup.com

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