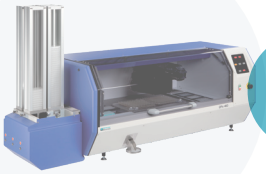
FORTÉBIO



Advances in phage display screening with technology innovation

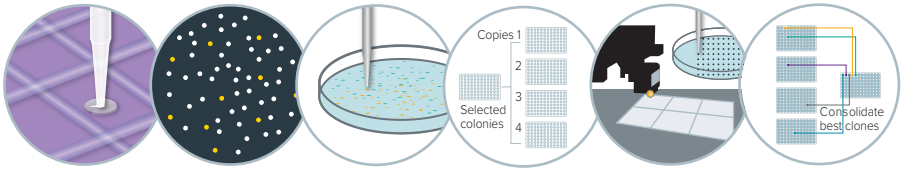
Overview

Phage display was first described in 1985, when George P. Smith demonstrated a way to insert an exogenous gene for a protein of interest into a bacteriophage coat protein gene. This caused the phage virus to display the protein on the phage surface, resulting in a connection between genotype and phenotype. The importance of phage display was recognized in 2018, when half of the Nobel Prize in Chemistry was shared between George P. Smith and Gregory P. Winter for their work developing the technique. Phage display was used to develop Humira (adalimumab), first approved in 2002, and countless other biological therapeutics.

More and more industrial applications from biotech to synthetic biology are using phage display because of its high throughput capabilities for protein interaction determination and protein engineering. However, in order to select high-affinity binders, or ligands, which can recognize a naïve target from a phage library (~10^7–10^{12}), non-binding bacteriophages need to be washed away, and phages that bind specifically with target molecules are eluted and harvested through 3–5 rounds of panning. Using conventional methods, this can be laborious to perform when screening multiple selections with different antigens simultaneously. To speed up their screening, scientists are incorporating new technologies like the QPix™ and Octet® systems into their workflow to speed up their phage display screening (Figure 1).

QPix system workflow

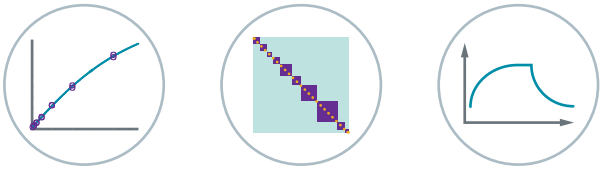
QPix systems automate and integrate many steps required to perform phage display such as plating, screening, picking, replicating, gridding, and re-arraying.



Plating | Screening | Picking | Replicating | Gridding (arraying) | Re-arraying

Octet system workflow

The concentration of primary hits from phage libraries can be measured easily using the Octet system, followed by high-throughput epitope binning and kinetics analysis to isolate high-affinity binders.



Quantitate proteins to identify primary hits | Epitope bin hits from phage library | Determine kinetic rate and binding constants

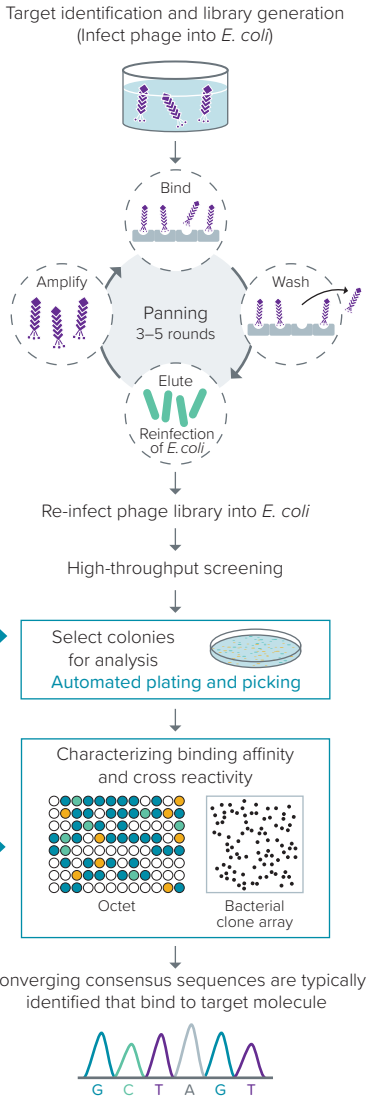


Figure 1: Typical phage display workflow showcasing where the QPix and Octet systems can be used.

The QPix 400 Series

The QPix 400 Series of Microbial Colony Pickers allow you to simultaneously detect colonies and quantify fluorescent markers when pre-screening colonies before picking. Objective, quantitative identification combined with high accuracy picking ensures the right colony is picked every time. This automated microbial screen system can pick up to 3000 clones per hour with a typical efficiency of >98%, significantly increasing speed, throughput and walk-away time. Additionally, clones can be screened in white light or fluorescence, and the system can select clones based on user-defined parameters such as compactness, axis ratio, size, proximity, and fluorescence level (Figure 2). This innovative high-throughput technology platform significantly speeds up phage display screening by automating repetitive tasks, reducing errors, and improving flexibility.

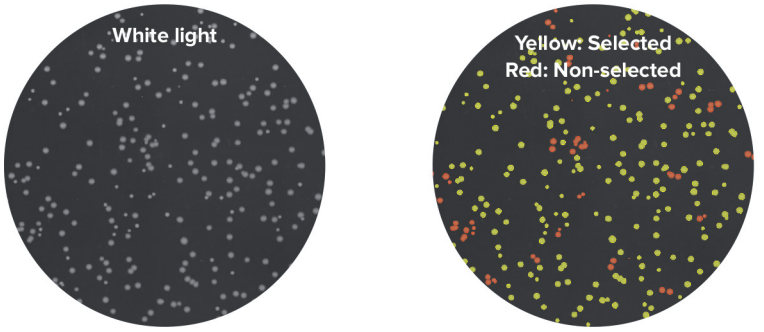
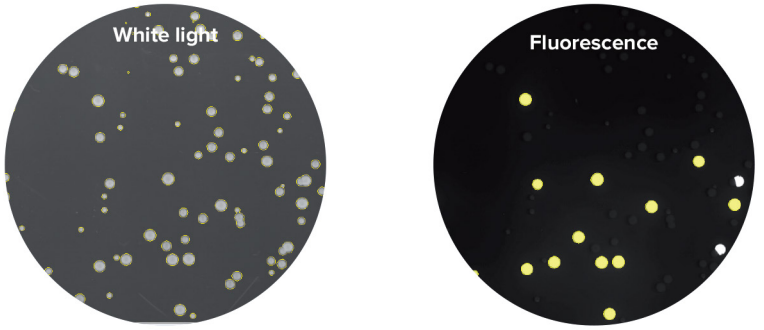
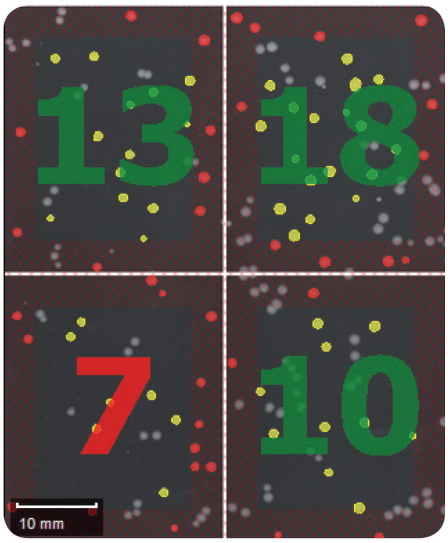


Image analysis software identifies individual colonies in white light. Colonies selected according to user-defined parameters: compactness, axis ratio, size, and proximity.



Optional pre-screening provides unique information to identify the best colonies. Colonies selected according to user-defined parameters: compactness, axis ratio, size, proximity, and fluorescent level.



Pre-defined number of colonies selected per region for picking. Yellow: Colonies to be picked based on selection criteria. Green: Desired number of colonies met. Red: Desired number of colonies not met.

Figure 2: The QPix systems simultaneously detect colonies and quantify fluorescent markers when pre-screening colonies before picking.

FORTÉBIO

www.fortebio.com

ForteBio
47661 Fremont Boulevard
Fremont, CA 94538
888.OCTET-75 or 650.322.1360
fortebio.info@moldev.com

ForteBio Analytics (Shanghai) Co., Ltd.
No. 88 Shang Ke Road
Zhangjiang Hi-tech Park
Shanghai, China 201210
salesops.china@moldev.com

Molecular Devices (UK) Ltd.
660-665 Eskdale
Winnersh Triangle
Wokingham, Berkshire
RG41 5TS, United Kingdom
+44 118 944 8000
uk@moldev.com

Molecular Devices (Germany) GmbH
Bismarckring 39
88400 Biberach an der Riss
Germany
+ 00800 665 32860