Non-binding Microplates

Microplates with Non-Binding Surface Properties for Biochemical Assays

High quality microplates with well-defined properties are essential prerequisites for reproducible results in advanced drug discovery. In addition to format and pigmentation, determining the best microplate surface for use within a specific application is a critical factor for successful high-throughput screening.

Polystyrene microplates with medium binding surfaces are commonly used for homogeneous biochemical HTS assays. Manufactured of carefully selected raw material batches, medium binding microplates demonstrate low reproducible biomolecule binding. As medium binding microplate surfaces are not physically modified, their surface characteristics are representative of pure polystyrene.

However, even low amounts of biomolecular binding (e.g. DNA, RNA, proteins, peptides) can cause an undesirable increase in background, resulting in decreased signal-to-noise ratio. Greiner Bio-One's non-binding microplate surfaces prevent unwanted non-specific binding, especially advantageous for sensitive biochemical assays.

Characterised by low protein, DNA, RNA and peptide binding properties (Fig. 1, Fig. 2) the new non-binding surfaces significantly increase assay sensitivity by reducing background and improving signal-to-noise ratio (Fig. 3).

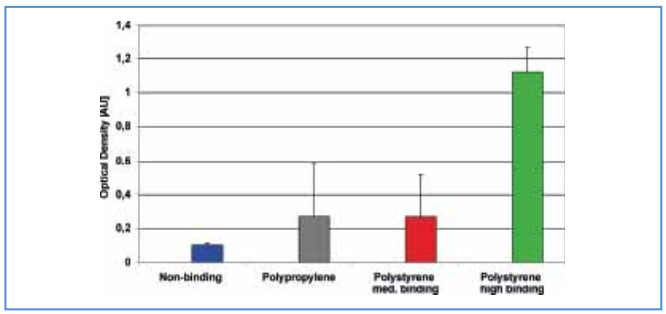

Figure 1:
Peptide binding (5.8 kDa) on different surfaces

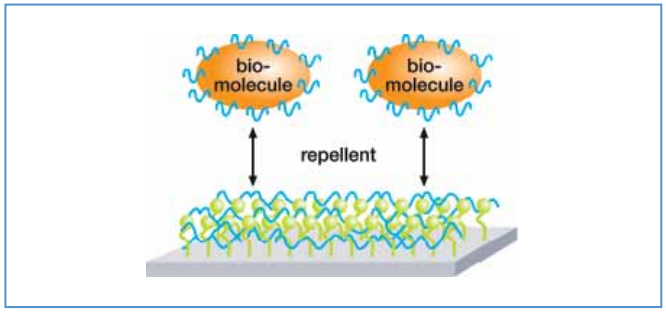

Figure 2:
Technology of the non-binding surface.
The hydrate layer, created by covalently linked functional groups, enables biomolecules to remain in solution, thereby preventing their binding to the surface.

Non-binding surfaces from Greiner Bio-One are achieved through a stable chemical modification to covalently link functional groups with the base polystyrene polymer. Under aqueous assay conditions a hydrate layer forms, preventing dissolved biomolecules from binding to the microplate surface (Fig. 2). As the non-binding surface is stable under common assay conditions (Fig. 4), there is no potential for degradation or leaching and resultant assay interference.

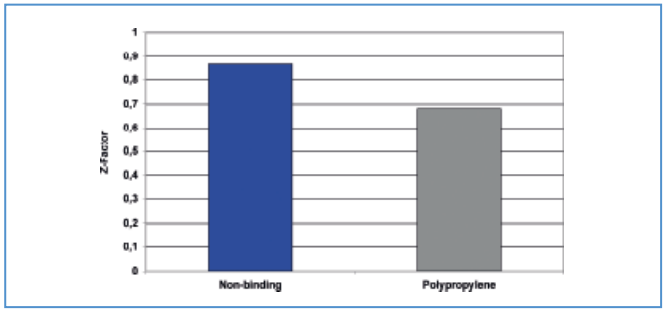

Figure 3:
Z-factor of a biochemical assay (Perkin Elmer TruPoint™ Caspase-6 assay). Comparison of non-binding versus polypropylene microplates. (The z-factor defines the precision of an assay; a factor of 1 represents the highest precision possible.) [1]

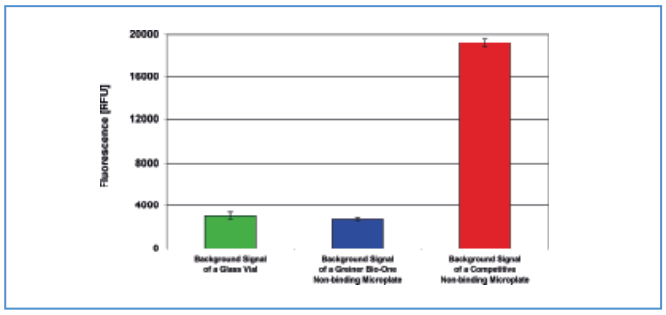

Figure 4:
Background signal using Quanti-iT™ Protein Detection Kit from Molecular Probes (Cat.-No. Q33210). The dye of the Quant-iT™ kit stains proteins as well as detergents. In the absence of protein, a high fluorescence signal indicates the presence of high amounts of dissolved detergents that have leached from the vessel surface.

Non-binding microplates are featured in 96, 384 and 1536 well formats in black, white and clear, including solid and µClear® film well bottoms.

Characteristic features of the non-binding surface are:
- Ultra low non-specific biomolecular binding properties (proteins, DNA, RNA)
- Long-term surface stability without degradation or leaching
- Higher assay sensitivity with reduced background

[1] Zhang et al.: Journal of Biomolecular Screening, Vol. 4 No. 2 (1999); 67-73