bioanalytics
xantec

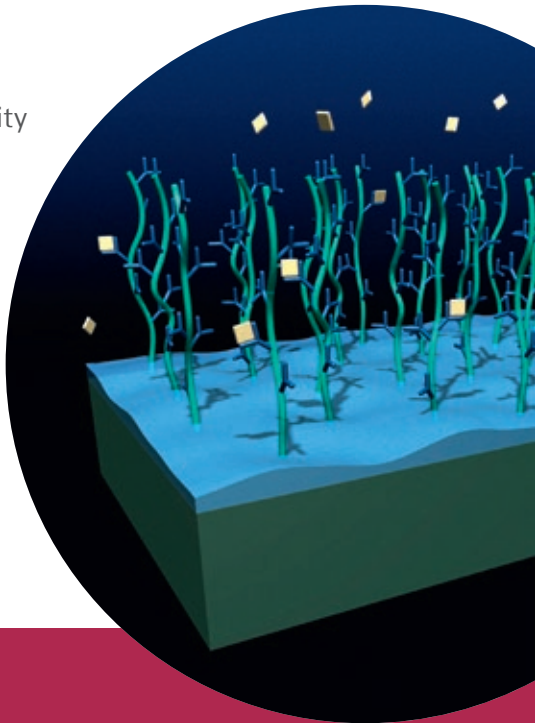
GIVE YOUR PROTEIN MICROARRAY A BOOST

XanTec's HC Protein microarray slides were designed for superior performance as protein chip substrates. Their preactivated surfaces are coated with a highly protein compatible hydrogel with properties similar to bioinert chro- matographic separation media. These hydrogel coatings are, therefore, the optimal choice for sensitive and selective protein detection, even in complex sample matrices like serum, cell lysates, environmental samples or fermenta- tion broths.

The HC coating's unique extended brush structure has a thickness of 1 – 2 µm and allows immobilization levels of > 50 ng/mm2 - up until now only achievable with thick film coatings such as nitrocellulose or polyacrylamide pads. How- ever, unlike these state-of-the-art 3D substrates, the revolutionary HC coatings minimize autofluorescence: as the background of HC hydrogel matrix is extremely low, signal/noise ratios of > 1000 can be achieved. As more than 50% of the spotted protein is covalently immobilized, spotting of low protein quantities below 100 amol/spot is possible, which makes arraying of expensive biomaterial economic. The biocompatible character of the HC hydrogel coating stabilizes the immobilized proteins and suppresses nonspecific binding. Block- ing is not required, which significantly enhances the biospecificity of the resulting protein arrays.

Key features of hydrogel coated HC microarray slides:

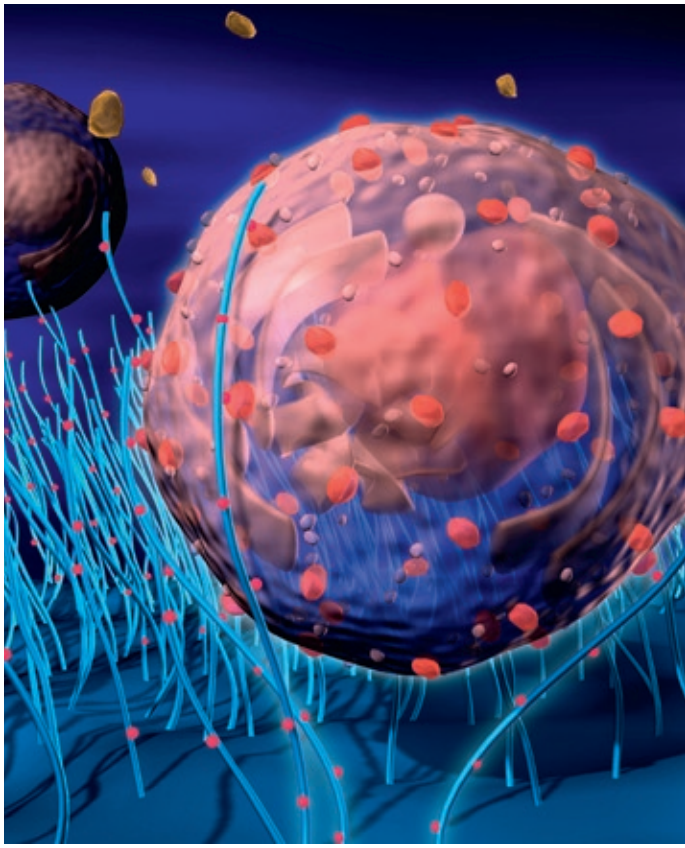
- High immobilization capacity of > 50 ng / mm2 ensures maximal signal intensity
- Protein compatible hydrogel matrix preserves activity of immobilized ligands
- Minimal autofluorescence and extremely low level of non-specific binding yield superior S/N ratios
- No blocking step required maximizes specificity of array
- NHS mediated covalent immobilization provides stable binding of proteins, peptides, small molecules, oligonucleotides.
- High immobilization efficiency saves precious biomaterial
- Excellent bioinertness allows work with serum and ultraspecific cell separation

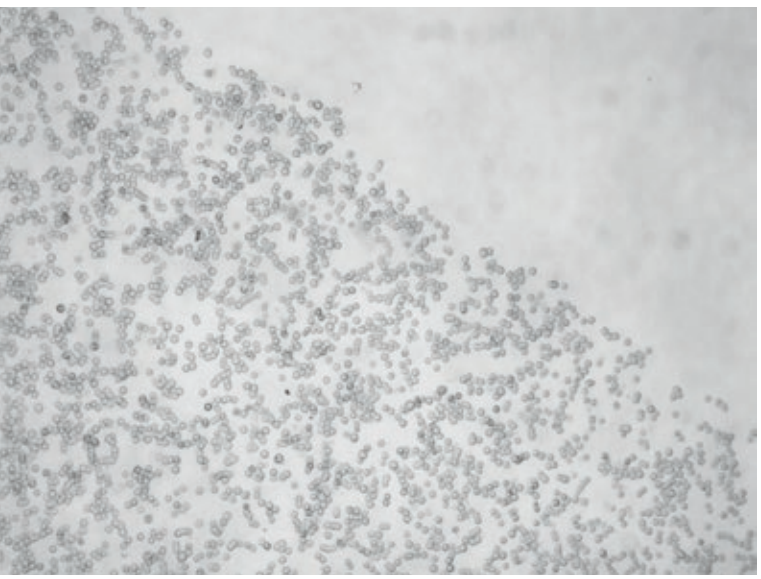


Featured application of HC hydrogel slides: Cell separation and immobilization

Initially developed for enhancing the sensitivity of protein microarrays, the brush-like structured HC hydrogel coatings are also an excellent surface for selectively attaching cells to solid supports. The non-modified form is inert, consisting of a highly hydrated, slightly negatively charged polymer matrix that effectively prevents non-specific cell adhesion. When coupled to specific receptor molecules (proteins, peptides, carbohydrates or small molecules), a high density of binding sites is generated which, in contrast to normal cross- linked hydrogel matrices, is sterically accessible for the relatively voluminous cells.

The flexible hydrophilic polymer chains of this 1-2 µm thin layer align them- selves smoothly to the cell surface and allow the receptor molecules to attach at multiple sites simultaneously. This results in specifically bound cells which are safely embedded in a cell friendly environment. In contrast to common panning techniques, it is not necessary to carefully optimize the incubation parameters or the reaction time as practically no time dependant non-specific adhesion occurs.





Left Figure: MDA breast tumour cells (surface antigen EGFR) in human serum were incubated on a partially antibody derivatized HC hydrogel surface.

Left: Anti EGFR IgG functionalized HC hydrogel surface.

Upper right corner: Blank HC hydrogel surface (control).

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The above separation technology based on HC hydrogel coatings is winner of the Prize for Medical Technology 2005 & 2009 awarded by the German Federal Ministry of Education and Research.