biomat LIFE SCIENCES

SURFACE SELECTION GUIDE 2026

COATED AND TREATED SURFACES · 96-WELL PLATES

Choose the surface that fits your molecule and your assay

More than 29 coated and treated surfaces for ELISA, CLIA, LIA and FIA, with the decision logic our technical team uses to match surface chemistry, plate color and format to your binding molecule.



www.biomat.it

HOW TO CHOOSE

How to choose the best surface for your molecule and application

Start from the molecule you need to bind, then match the plate color to your detection method. For most sandwich immunoassays that bind antibodies or proteins above 10 kDa, start with High Binding. For biotinylated targets, or any assay that needs oriented binding, use Streptavidin. For peptides and haptens below 5 kDa that wash off passive surfaces, use a covalent surface such as Maleimide.

Three ways a surface holds your molecule

Passive adsorption

Hydrophobic, van der Waals and electrostatic forces hold the protein on the polystyrene, with no coupling reagent. High Binding for antibodies and proteins above 10 kDa, Medium Binding for hydrophobic and lipid-rich proteins above 10 kDa, No Binding when nothing must stick to the well.

Affinity binding

A specific coated protein binds by affinity the target molecule and keeps it oriented, with its binding sites free. Streptavidin, Neutravidin and Biotin for biotin systems, Protein A, G and A/G for IgG through the Fc region, secondary and anti-human antibodies, lectins and anti-tag antibodies for specific targets.

Covalent coupling

A chemical bond fixes small molecules that passive adsorption cannot hold through the washing steps. Maleimide reacts with free sulfhydryl groups, Carboxylated and Aminated surfaces couple amines and carboxyls through EDC/NHS chemistry or crosslinkers.

The decision in four steps

01
Detection mode

Colorimetric ELISA: clear plate. Luminescence and CLIA: white plate. Fluorescence and FIA: black plate.

02
Binding molecule

Pick the surface family for your molecule with the quick reference on the next page.

03
Format

Breakable strips (350 µl) or 8-well strips (360 µl) for R&D and variable throughput, solid plates (400 µl) for production and automation, all with SBS footprint. Special surfaces: clear breakable strips. Codes in the Product Catalog 2026.

04
Quality

Ask for the lot-specific Certificate of Quality. Biomat works under an ISO 9001:2015 certified quality management system.

Surface selection quick reference

Your molecule	Recommended surface	Binding mechanism
Antibodies and hydrophilic proteins above 10 kDa	High Binding	Passive, ionic and hydrophobic
Large hydrophobic or lipid-rich proteins, raw viral antigens above 10 kDa	Medium Binding	Passive, hydrophobic
Molecules that must not bind or change activity, such as enzymes	No Binding	Treated to prevent adsorption
Peptides and small molecules (1,000 to 5,000 Da) with a terminal cysteine, thiol-containing haptens	Maleimide	Covalent, sulfhydryl groups
Peptides and small molecules (1,000 to 5,000 Da) with amino or carboxyl groups	Carboxylated, Aminated	Covalent, EDC/NHS or crosslinkers
Biotinylated antibodies, antigens, peptides, oligonucleotides	Streptavidin, Streptavidin High Binding	Affinity, biotin-streptavidin
Biotinylated molecules in cell lysates or membrane fractions	Neutravidin	Affinity, minimal non-specific binding
Avidin, streptavidin or neutravidin conjugates	Biotin	Affinity, biotin-avidin
IgG that needs oriented binding	Protein A, Protein G, Protein A/G	Fc-specific
Mouse or rabbit IgG in low quantity	Goat anti-mouse IgG, goat anti-rabbit IgG	Fc-specific, one species
Human IgG, IgA or IgM in a sandwich immunoassay	Goat anti-human IgG, IgA, IgM	Fc-specific, one class
Human IgG1	Mouse anti-human IgG1 Fc	Fc-specific, human IgG1
Glycoproteins and carbohydrate-binding proteins	Concanavalin A, Jacalin, Wheat Germ	Carbohydrate recognition
Nucleic acids, plasminogen, proteases	Poly-L-Lysine, Poly-L-Arginine	Electrostatic
Unfractionated heparin	Heparin Catcher HC1, HC2, HC3	Heparin capture, competitive assay
His, GST or DYKDDDDK fusion proteins	Mab anti-His, anti-GST, anti-DYKDDDDK	Tag-specific antibody
Antibody response to KLH, Tetanus Toxoid, DNP, TNP	Immunotoxicity plates	Antigen-coated
Isotype of a mouse monoclonal antibody	Mouse mAb isotyping plates	Class and subclass-specific

Match the plate color to the detection method

Detection	Plate color	Why
Absorbance, colorimetric ELISA	Clear	Light passes through the sample to the detector
Luminescence, CLIA	White	The white polymer reflects the weak light signal toward the reader
Fluorescence, FIA	Black	The black polymer absorbs stray excitation light and reduces background and crosstalk

Coated surfaces are blocked, with standard ELISA blocking or non-proteic BlockerWell blocking depending on the surface. High, Medium and No Binding plates are supplied without blocking.

Common problems and the surface that solves them

Troubleshooting usually comes from buffers, incubation times and protein concentrations. Check the surface first: changing it is often faster than another round of protocol optimization.

Low signal with optimized conditions

LIKELY CAUSE

Binding capacity too low, or the wrong surface type.

SURFACE SOLUTION

Move from Medium Binding to High Binding, or from tissue culture plates to plates made for immunoassays.

High, variable background

LIKELY CAUSE

Non-specific binding on a surface that is too sticky for the sample.

SURFACE SOLUTION

Move from High Binding to Medium Binding, or review blocking. For biotin systems, Neutravidin gives lower non-specific binding than streptavidin.

Small peptides do not bind or wash off

LIKELY CAUSE

Molecules below 5 kDa have too little contact area for stable passive adsorption.

SURFACE SOLUTION

Use covalent coupling: Maleimide for cysteine-containing peptides, Aminated or Carboxylated for amino and carboxyl groups. As an alternative, biotinylate the peptide and bind it on Streptavidin.

Binding antibody with poor activity

LIKELY CAUSE

Random orientation during passive adsorption hides many antigen-binding sites.

SURFACE SOLUTION

Biotinylate the antibody and bind it on a Streptavidin plate. Protein A, G or A/G give Fc-oriented binding but are generally not suited to sandwich immunoassay.

Results change from lot to lot

LIKELY CAUSE

Variability in the surface treatment between production lots.

SURFACE SOLUTION

Ask for the lot-specific Certificate of Quality. Biomat tests every lot for uniformity and reproducibility and compares it with previous lots.

NO SURFACE FITS YOUR ASSAY?

We develop surfaces together with your team to optimize kit performance.

STANDARD SURFACES

Supplied without blocking.

SURFACE	TYPICAL USES	BINDING CAPACITY · QC TEST	CV	STORAGE · SHELF LIFE
High Binding Hydrophilic polystyrene for passive adsorption of proteins above 10 kDa.	Sandwich immunoassays, viral and bacterial antigens for IgG assays, competitive immunoassays for steroid hormones	**500-600 ng IgG/cm²**	**< 5%**	Room temp. 5 years
Medium Binding Hydrophobic polystyrene for antibodies and polypeptides above 10 kDa. Lower capacity preserves native conformation.	Raw viral and bacterial antigens, amphipathic proteins, lipoproteins, lipid-rich samples	**200-300 ng IgG/cm²**	**< 5%**	Room temp. 5 years
No Binding Treated to prevent protein binding, so the well does not change the activity of molecules such as enzymes.	Homogeneous assays, sample storage without analyte loss to the well	**No molecules adsorption**	**< 10%**	Room temp. 2 years

COVALENT COUPLING

For small molecules that passive adsorption cannot hold through the washes.

SURFACE	TYPICAL USES	BINDING CAPACITY · QC TEST	CV	STORAGE · SHELF LIFE
Aminated Primary amino groups for coupling amino, carboxyl or thiol groups through EDC/NHS, glutaraldehyde or SMCC.	Peptides of 1,000-5,000 Da, drugs, toxins, hormones, Fab-SH fragments, nucleic acids	**300 ng/well – 150 pMol/well using Biotin-PEG_{28}-COOH (M.W. 2,000 Da)**	**< 5%**	Room temp. 2 years
Carboxylated Carboxyl groups for EDC/NHS-mediated amide bonds with free amino groups. Also on PCR plates and 8-strip tubes.	Peptides of 1,000-5,000 Da, drugs, toxins, hormones	**100-200 ng/well – 50-100 pMol/well using Biotin-PEG_{28}-NH_2 (M.W. 2,000 Da)**	**< 5%**	Room temp. 2 years
Maleimide Binds free sulfhydryl groups at pH 6.5-7.5, for molecules that are difficult to coat onto polystyrene. Also on PCR plates and 8-strip tubes.	Peptides with a terminal cysteine, thiol-containing haptens	**250 ng/well – 440 pMol/well using Glutathione Ethyl Ester Biotin Amide (M.W. 561 Da)**	**< 10%**	2-8 °C 1 year (plates)

BIOTIN-BINDING SURFACES

Affinity constant 10^{-15} M. Supplied blocked.

SURFACE	TYPICAL USES	BINDING CAPACITY · QC TEST	CV	STORAGE · SHELF LIFE
Streptavidin Binds any biotinylated molecule with consistent orientation. Also on PCR plates and 8-strip tubes.	Biotinylated antibodies, antigens, peptides, oligonucleotides, DNA fragments	**Biotin ~12-14 pmol/well (200 µl)** **Biotinylated IgG 100 ng/well***	**< 5%**	2-8 °C 3 years (plates)
Streptavidin High Binding Polymer of streptavidin molecules with more biotin-binding sites. Also on PCR plates and 8-strip tubes.	Biotinylated proteins, peptides, oligonucleotides when higher capacity is needed	**Biotin >25 pmol/well (100 µl)** **Biotinylated IgG 100 ng/well***	**< 5%**	2-8 °C 3 years (plates)
Neutravidin Deglycosylated avidin (pI 6.3), no RYD sequence: the lowest non-specific binding of the biotin-binding proteins.	Biotinylated molecules in cell lysates or membrane fractions	**Biotin ~5-6 pmol/well (100 µl)** **Biotinylated IgG 100 ng/well***	**< 5%**	2-8 °C 2 years
Biotin Biotin-coated surface for avidin, streptavidin and neutravidin, with unchanged optical properties.	Assays with avidin, streptavidin, neutravidin and their conjugates	**2 µg/ml of streptavidin-peroxidase**	**< 5%**	2-8 °C 3 years

* The binding to biotinylated IgG remains the same among the three proteins because it is due to the high molecular weight of IgG and its steric hindrance.

Immunoglobulin-binding surfaces and lectins

IMMUNOGLOBULIN BINDING PROTEINS

Fc-oriented capture, generally not suited to sandwich ELISA. Also on PCR plates and 8-strip tubes. Supplied blocked.

SURFACE	TYPICAL USES	BINDING CAPACITY · QC TEST	CV	STORAGE · SHELF LIFE
Protein A, G, A/G Protein A, G, A/G bind mammalian immunoglobulins with different strength, so refer to table 1 at Biomat.it to identify the one that is most useful for your purpose.	Oriented IgG binding through its Fc region leaving the $F(ab)_2$ sites free, separation of IgG from complexes and contaminants, fusion proteins	**2.66-3.33 pmol IgG/well (100 µl)** **400-500 ng/well**	**< 10%**	2-8 °C 2 years (plates)

SECONDARY ANTIBODIES

They bind only the target species, unlike Protein A or G. Supplied blocked.

SURFACE	TYPICAL USES	BINDING CAPACITY · QC TEST	CV	STORAGE · SHELF LIFE
Goat anti-mouse IgG Fcγ Binds mouse IgG1, IgG2a, IgG2b and IgG3, with minimal cross-reaction to human, bovine and rabbit serum proteins.	Sandwich and competitive immunoassays, scarce mouse antibodies	**~0.63 pmol mouse IgG/well (100 µl)** **mouse IgG 100 ng/well**	**< 5%**	2-8 °C 18 months
Goat anti-rabbit IgG Fc Binds the Fc region of rabbit IgG, with minimal cross-reaction to human serum proteins.	Sandwich and competitive immunoassays, rabbit antibodies in low quantity	**~0.63 pmol rabbit IgG/well (100 µl)** **rabbit IgG 100 ng/well**	**< 5%**	2-8 °C 18 months

ANTI-HUMAN IMMUNOGLOBULINS

Affinity purified, Fc specific, for sandwich ELISA of human immunoglobulins with the matching HRP conjugate. Supplied blocked.

SURFACE	TYPICAL USES	BINDING CAPACITY · QC TEST	CV	STORAGE · SHELF LIFE
Goat anti-human IgG Fcγ Minimal cross-reaction to human IgM and IgA.	Human IgG in serum, plasma, urine, cerebrospinal fluid, saliva	**~50 ng human IgG/well**	**< 10%**	2-8 °C 1 year
Goat anti-human IgM Fcµ Minimal cross-reaction to human IgG and IgA.	Human IgM in serum, plasma and other biological fluids	**~300 ng human IgM/well**	**< 5%**	2-8 °C to expiry date
Goat anti-human IgA Fcα Minimal cross-reaction to human IgG and IgM.	Human IgA in serum, plasma, saliva and other fluids	**≤100 ng human IgA/well**	**< 5%**	2-8 °C 1 year
Mouse anti-human IgG1 Fc NEW No cross-reaction to human IgG2, IgG3, IgG4, IgM and IgA. For pharmacological evaluations in oncology and IgG1 diagnostics. Also on 384-well plates.	Plasma, serum, tissue lysate, cerebrospinal fluid, saliva, urine, cell culture supernatant	**~500 ng human IgG1/well** **384-well: ~200 ng/well**	**< 10%**	2-8 °C 1 year

LECTINS

Carbohydrate-specific capture. Supplied blocked.

SURFACE	TYPICAL USES	BINDING CAPACITY · QC TEST	CV	STORAGE · SHELF LIFE
Concanavalin A Affinity for α-D-mannopyranosyl and α-D-glucopyranosyl residues.	Glycoproteins, enzyme-antibody conjugates, polysaccharides, glycolipids	**100 ng/ml of IgG-HRP**	**< 5%**	2-8 °C 2 years
Jacalin Tetrameric lectin (40 kDa) with affinity for α-D-galactosyl groups of human IgA1.	Oriented binding and purification of human IgA1, separation of immunocomplexes	**~4 pmol IgA/well (100 µl)** **600 ng/well of IgA**	**< 5%**	Room temp. 2 years
Wheat Germ Affinity for N-acetyl-D-glucosamine residues of glycoproteins and enzymes.	Glycoprotein purification, including membrane glycoproteins	**100 ng/ml of IgG-HRP**	**< 5%**	2-8 °C 2 years

Polyamino acids, Heparin Catcher, special surfaces

POLYAMINO ACIDS

Optical properties of the polystyrene unchanged. Supplied blocked.

SURFACE	TYPICAL USES	BINDING CAPACITY · QC TEST	CV	STORAGE · SHELF LIFE
Poly-L-Lysine α-amino, α-carboxyl and ε-amino groups that react through electrostatic and stereospecific bonds.	Plasminogen and plasminogen activator, ribosomal RNA, double-stranded DNA	**5 µg/ml dsDNA from calf thymus**	**< 5%**	2-8 °C 2 years
Poly-L-Arginine High density of α-amino, α-carboxyl and guanidino groups for electrostatic and stereospecific bonds.	Serine proteases, maturation promoting factors	**n.a.**	**< 5%**	2-8 °C 1 year

HEPARIN CATCHER

Choose the plate by the heparin concentration of your samples. Supplied blocked.

SURFACE	TYPICAL USES	BINDING CAPACITY · QC TEST	CV	STORAGE · SHELF LIFE
HC1, HC2, HC3 Immobilizes heparin without modifying the molecule, for competitive ELISA of unfractionated heparin.	Heparin in low-protein fluids such as buffers	**HC1** **Range 0.01-2.0 IU/ml**	**< 5%**	2-8 °C 1 year
		HC2 **Range 0.5-40.0 IU/ml**	**< 5%**	2-8 °C 1 year
		HC3 **Range 2.0-160.0 IU/ml**	**< 5%**	Room temp. 1 year

SPECIAL SURFACES

Clear 8-well breakable strips. Supplied blocked.

SURFACE	TYPICAL USES	BINDING CAPACITY · QC TEST	CV	STORAGE · SHELF LIFE
Immunotoxicity Antigen-coated plates for IgM and IgG ELISA in T-cell dependent antibody response (TDAR) studies.	Vaccine efficacy, immune status versus controls	**KLH** **Mouse IgG anti-KLH ~25 ng/well**	**< 5%**	2-8 °C 2 years
		DNP **Mouse IgG anti-DNP ~12.5 ng/well**	**< 5%**	2-8 °C 2 years
		TNP **Mouse IgG anti-TNP ~25 ng/well**	**< 10%**	2-8 °C 2 years
		TETANUS TOXOID **Mouse IgG anti-TT ~12.5 ng/well**	**< 10%**	2-8 °C 2 years
Mab anti-tag Mouse monoclonal antibodies that capture tag-fusion proteins directly from cell lysates, with no pre-purification.	Expression screening in lysates, serum screening for antibodies to the fusion protein	**HIS** **HSA-His 200-400 ng/well (100 µl)**	**< 6%**	2-8 °C 2 years
		GST **GST ~100 ng/well (100 µl)**	**< 7%**	2-8 °C 2 years
		DYKDDDDK **Flag-ubiquitin ~600 ng/well (100 µl)**	**< 7%**	2-8 °C 2 years
Mouse mAb isotyping Each 8-well strip is coated with goat anti-mouse IgG1, IgG2a, IgG2b, IgG3, IgA, IgM, kappa and lambda. Results in under 90 minutes.	mAbs from hybridoma supernatant, ascites or purified stocks; assay reagents available	**Detects ≥0.05-0.1 µg/ml IgG1-IgG2a, IgG2b, IgG3, ≥0.1-0.2 µg/ml IgM and IgA**	**< 10%**	2-8 °C 2 years

Tell us your binding molecule and your detection method

Our technical team will suggest the surfaces to evaluate, check trial package availability and quote volumes for your production.

REQUEST A QUOTE
www.biomat.it

EMAIL
info@biomat.it

PHONE
+39 0464 357951

biomat
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Biomat Srl · Via Trento 124 · 38061 Ala, fraz. Santa Margherita (TN) · Italy · www.biomat.it

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