NuGel™ Poly-Epoxy
Polymer Coated Silica Affinity Matrices

Special Features of NuGel™:
- Non-specific sites are virtually eliminated by a polymer coating
- Stable across a wide pH range 2 - 10
- 1000Å, 50µm Silica suitable for LC and batch processes

Special Features of Poly-Epoxy ligand:
- Covalently couples ligands containing free amino or thiol groups at pH 7.5 to 9.0.
- Covalently couples non-polar ligands in organic solvents.

Silica has been an industry standard as an advantageous matrix suitable for high performance liquid chromatography. With NuGel™, non-specific sites have been virtually eliminated making it an ideal support for affinity purification. Through a proprietary polymer coating, Silica is cross linked forming a reactive Poly-Epoxy functionality stable across a wide pH range (pH 2 to 10). From this foundational chemistry, all of the NuGel™ affinity products are derived.

<table>
<thead>
<tr>
<th>Product Name</th>
<th>Matrix Reactive Group</th>
<th>Ligand Reactive Group</th>
<th>Special Features</th>
<th>Size</th>
<th>Column Volume (Approx)</th>
<th>Item No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>NuGel™ Poly-Epoxy</td>
<td>Terminal Epoxy</td>
<td>Amino</td>
<td>Direct Coupling of Amino Groups</td>
<td>25 Grams</td>
<td>50 ml</td>
<td>NPEY-25</td>
</tr>
<tr>
<td>NuGel™ Poly-Amine</td>
<td>Terminal Amine</td>
<td>Carboxylic Acid, or Carbohydrate</td>
<td>Carbodiimamide reaction, or NaIO₄ derived Aldehyde</td>
<td>25 Grams</td>
<td>50 ml</td>
<td>NPAM-25</td>
</tr>
<tr>
<td>NuGel™ Poly-Aldehyde</td>
<td>Terminal Aldehyde</td>
<td>Amino</td>
<td>Direct Coupling of Amino Groups</td>
<td>25 Grams</td>
<td>50 ml</td>
<td>NPAY-25</td>
</tr>
<tr>
<td>NuGel™ Poly-Hydroxy</td>
<td>Terminal Glycol</td>
<td>Amino</td>
<td>Carbodiimazole mediated reaction</td>
<td>25 Grams</td>
<td>50 ml</td>
<td>NPHX-25</td>
</tr>
<tr>
<td>NuGel™ Poly-Carboxy</td>
<td>Terminal Carboxylic Acid</td>
<td>Amino</td>
<td>Carbodiimamide mediated reaction</td>
<td>25 Grams</td>
<td>50 ml</td>
<td>NPCY-25</td>
</tr>
</tbody>
</table>

* Kilogram quantities and other particle sizes and porosity of NuGel™ are also available upon request.
**NuGel™ Poly-Epoxy Protocol**

NuGel™ Poly-Epoxy has a proprietary polymer coating, silica is cross linked forming a reactive Poly-Epoxy functionality stable across a wide pH range (pH 2 to 10). This support contains epoxy groups at the end of hydrophilic spacer arms and is used to couple ligands containing amino groups, thiol groups, proteins and peptides. Compatible with organic solvents.

**Technical Data**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spacer Arm</td>
<td>Polymerized Hydrophilic Carbon Chain</td>
</tr>
<tr>
<td>Porosity</td>
<td>1000Å</td>
</tr>
<tr>
<td>Average Particle Size</td>
<td>50µm</td>
</tr>
<tr>
<td>Substitution Level</td>
<td>100-200 uEq/gm of epoxy groups</td>
</tr>
</tbody>
</table>

**Special Features:**
- Couples ligands containing free amino or thiol groups at pH 7.5 to 9.0.
- Couples non-polar ligands in organic solvents.

**Poly-Epoxy Protocol for Aqueous Coupling**

(Organic solvents may be used for non-protein ligands, contact Technical Services)

1. Epoxy derivatives readily react with ligands containing hydroxyl, amine or thiol group to yield covalently coupled protein-ligand in aqueous solutions. At neutral pH, sulphydryl groups couple more readily than amino groups. The unreacted groups are subsequently blocked with Ethanolamine. For protein-ligands, optimal coupling takes place under high protein concentrations, 10-20 mg/ml. Typically protein (i.e. IgG) coupling ranges from 5 to 10 mg/gram support. Suitable coupling buffers are:
   a. 0.1-0.5 M Phosphate, pH 7.5 – 8.5, preferably with 0.1 – 0.5 M NaCl
   b. Do not use Tris or Glycine buffers as they contain amines.
2. One gram of NuGel™Poly-Epoxy produces approximately 2 ml column (or bed) volume. Weigh out required amount and wash on a sintered glass filter funnel with DI water and then wash again with coupling buffer. Transfer to mixing vessel.
3. Transfer the protein-ligand solution to the washed NuGel™. Mix by orbital shaker or overhead stirrer. Do not use magnetic stirrer. Mix at room temperature (for proteins) or at 30degrees C(for small ligands) for 24-48 hours.
4. Using a filter or column, wash the coupled suspension with water/buffer. If necessary, block the excess active groups by suspending in 1 M Ethanolamine, pH 7.5-8.5 for 6 hours. Wash the gel extensively with PBS. Store at 4°C in a well-sealed container.

**Operating Modes**

Since the support matrix is based on a rigid 50 µm particle, NuGel™ can be operated in low pressure pump or gravity flow columns, or in batch mode.
Related NuGel™ References

**Patents**

- Monoclonal antibodies directed to the cytotoxic lymphocyte maturation factor European Patent EP0790255
- Purification of immunoglobulins using affinity chromatography and peptide US 2006/0153834 A1

**Affinity**

- Dermot Walls, Robert McGrath and Sinéad T.Loughran *A Digest of Protein Purification*. *Methods Molecular Biology*. Volume 681: 3-23 (2011)
- Expression and folding of an antibody fragment selected in vivo for high expression levels in *Escherichia coli* cytoplasm. *Research in Microbiology* Volume 153, Issue 7, September 2002, Pages 469-474
- Identification of model peptides as affinity ligands for the purification of humanized monoclonal antibodies by means of phage display *Journal of Biochemical and Biophysical Methods* Volume 49, Issues 1-3.2001

A Digest of Protein Purification and partial amino acid sequence of a 28 kDa cyclophilin-like component of the rat liver sigma receptor. Life Sciences, Volume 55, Issue 8, 1994.


Identification of model peptides as affinity ligands for the purification of humanized monoclonal antibodies by means of phage display. Methods in Molecular Biology, 2000, Volume 147, 209-220


**Ion Exchange**


**Contact Us**

We welcome your questions and comments regarding our products.

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