# MagVigen™ - $NH_2$ Surface

## Cat # 21001

### Product Description

MagVigen™ - $NH_2$ surface nanoparticles provide you with the flexibility of coupling to various molecules through simple bioconjugation reactions. The resulting MagVigen™ bioconjugates could be exploited to achieve highly specific binding for cell isolation, protein, DNA/RNA purification or immunoprecipitation assays. Examples of biomolecules that could be covalently bound to MagVigen™ surfaces include primary antibody, protein/peptide, DNA/RNA or other ligands.

### Advantages of MagVigen™ magnetic nanoparticles

- Magnetically responsive to a magnet, easy for bio-conjugation and purification
- Smaller nanoparticle size, higher binding capacity, longer settling time, compatible to automation and high throughput workflow
- Optimal surface chemistry, low non-specific binding
- Consistent, high quality results

### Product and Related Product Contents

- MagVigen™ - $NH_2$ surface nanoparticles (Cat# 21001) are provided in phosphate buffered saline (PBS), pH 7.4. Each vial contains 1 ml of solution with a particle concentration of 4 mg/ml.
- Washing Buffer (10X), Cat# A20001.
- Magnet, Cat# A20003.

All materials except the magnet should be stored at 4°C for up to 1 year.

### Protocol

**I. This protocol provides a general guidance for conjugation of biomolecules to MagVigen™-NH2 surface through EDC/NHS crosslinking of carboxylates with primary amines on nanoparticle surfaces. Please adjust the amount of reagents for specific application.**

1. Determine needed surface coverage of biomolecules per nanoparticle. **Note:** The general range is about 0.1 -1 mg proteins (50kDa) per mg of MagVigen™.
2. Dissolve the protein in a buffer of 0.1M MES (2-[morpholino]ethanesulfonic acid) and 0.5M NaCl at pH 6.0, for example, prepare 0.2 ml of protein at 10 mg/ml.
3. Add 0.08 mg of EDC to 0.2 ml of the above protein, based on a 50kDa protein, 10 fold excess of EDC (1-ethyl-3-[3-dimethylaminopropyl] carbodiimide) to protein quantity is applied.
4. Add 0.12mg of NHS (N-hydroxysuccinimide) or 0.22mg of Sulfo-NHS (N-hydroxysulfosuccinimide) to the reaction (final concentration 5 mM).
5. Mix the solution well and react for 15 min at room temperature.
6. Gently vortex MagVigen™-NH2, then separate the nanoparticles from the solution by placing the magnet on the side of the tube for 1-2 min and remove the supernatant carefully (with magnet still on the side).
   **Note**: *A clear precipitate containing dark brown colored nanoparticles should become visible on the side of the micro-centrifuge tube.*
7. Remove the magnet and disperse the pellet in 1ml of 1x Washing Buffer. Repeat step 6, wash once. Then re- disperse MagVigen™-$NH_2$ in 1 ml of 1x Washing Buffer.
8. Mix the EDC/NHS activated protein solutions with MagVigen™-$NH_2$ solution; react for 2 hours at room temperature.
9. Separate the nanoparticles from the solution by placing the magnet on the side of the tube for 1-2 min and remove the supernatant carefully (with magnet still on the side). Wash 2 times with PBS or other buffer solution. Remove non-magnetically captured solution.
10. Resuspend washed MagVigen™-protein conjugates into preferred buffer, ready to use.

**II. This protocol provides a general guidance for conjugation of biomolecules to MagVigen™-$NH_2$ surface through sulfo-SMCC (Succinimidyl trans-4(maleimidylmethyl) cyclohexane-1-carboxylate) based crosslinker utilizing –SH group of the biomolecule. Please adjust the amount of reagents for specific application.**

1. Determine needed surface coverage of biomolecules per nanoparticle. Note: The general range is about 0.1 -1 mg proteins (50kDa) per mg of MagVigen™.
2. Gently vortex MagVigen™-$NH_2$, then separate the nanoparticles from the solution by placing the magnet on the side of the tube for 1-2 min and remove the supernatant carefully (with magnet still on the side).
3. Remove the magnet and disperse the pellet in 1ml of 1x Washing Buffer. Repeat step 2, wash once. Then re-disperse MagVigen™-NH2 in 1 ml of 1x Washing Buffer.
4. Add Sulfo-SMCC into 200 µl PBS buffer, then mix with above MagVigen™-$NH_2$ solution, Incubate for 40-60 min. The ratio of Sulfo-SMCC to MagVigen™ is at 0.05 mg of Sulfo-SMCC per 1 mg of MagVigen™.
5. Separate the Sulfo-SMCC activated nanoparticles from the solution by placing the magnet on the side of the tube for 1-2 min, and then remove the supernatant carefully (with magnet still on the side). Then wash twice using 1x washing buffer.
6. Dissolve desired amount of proteins into 1x PBS solution.
7. Mix the protein solution with the Sulfo-SMCC activated nanoparticle solution, incubate for 2 hours. For maximal binding, overnight incubation could be applied.
8. Separate the MagVigen™-protein conjugates from the solution by placing the magnet on the side of the tube for 1-2 min and remove the supernatant carefully (with magnet still on the side). Wash twice using 1x washing buffer or other preferred buffer.
9. Resuspend washed MagVigen™-protein conjugates into preferred buffer, ready to use.