



PRODUCT DATA SHEET

NHS-Activated Gold NanoUrchins Conjugation Kit

Description

Cytodiagnosics NHS-activated Gold NanoUrchin Conjugation Kits have been optimized for high efficiency one-step conjugations of proteins and other primary amine-containing ligands to gold nano-urchins with diameters in the size range of 50nm-100nm.

The kit contains ready-to-use pre-made mixtures. No activation or manipulation of the gold nano-urchin is required prior to conjugation, which often results in poor performing conjugates. Simply mix your protein with the pre-activated NHS ester gold nano-urchin supplied in the kit.

Kits are available in convenient 3 or 10 small-scale reactions formats allowing multiple to be conjugated simultaneously and ready for use in 2.5 hours or less. These kits are ideal for screening and optimization purposes prior to scale-up production. Scale up can be performed with our NHS-Activated Gold NanoUrchin Conjugation MIDI kits.

Features & Benefits

- Results in covalently bound ligand and more stable conjugate.
- Fast and convenient one-step conjugation reaction with no pre-activation requirements
- Spacer between the gold nano-urchin surface and conjugated ligand minimizes effects on the tertiary protein structure, which can lead to poor performing conjugates, which is a common problem seen in conjugates prepared by passive adsorption.

Applications

- Ideal for development of protein gold conjugates for use in applications such as blotting, lateral flow assays, microscopy and transmission electron microscopy (TEM).

Kit Components

- NHS-Activated Gold NanoUrchins (lyophilized)
- Protein Re-suspension Buffer
- Reaction Buffer
- Quencher Solution

NHS-Activated Gold NanoUrchin Specifications

Gold surface: NHS-ester (spacer between gold surface and NHS-group)

Core diameter: Available with diameters from 50nm-100nm
Optical density (OD): OD=20 when the contents of each vial is dissolved to a final volume of 100ul.

Particles per ml: Core size dependant, please see table II.

Lambda max: Core size dependant, please see table II.
Supplied in ready to use lyophilized format

Storage

All components of this kit should be stored at -20°C. If stored unopened and as specified, Cytodiagnosics NHS-activated gold nano-urchins are stable for at least 3 months.

Product Safety and Handling

This product is for R&D use only, not for drug, household, or other uses. Please review the material safety datasheet (MSDS) available online for proper safety and handling procedures.

Factors to Consider Prior to Conjugation

The protein/antibody or other ligand to be conjugated needs to be in a purified form, and proper care must be taken to ensure that the ligand stock is devoid of the following for proper functionality:

- No additional protein additives such as BSA
- Avoid free amino acids (e.g. glycine)
- Avoid common thiol additives such as DTT, TCEP and mercaptoethanol
- Avoid EDTA
- Avoid primary amine containing buffers or components (e.g. Tris)
- Avoid use of strong buffers that might change the pH of the conjugation reaction. See paragraph below for recommended buffers for optimal performance of the kit.

If your protein/antibody stock contains any of the above, dialyse or use a desalting column to transfer your ligand into a compatible buffer such as sodium phosphate, MES, MOPS or HEPES. If contaminating proteins such as BSA is present, the protein needs to be purified prior to conjugation.



Conjugation Protocol

A recommended starting protocol for conjugation can be found below. Note that the amount of protein added may need to be optimized for your particular protein.

1. Allow all reagents to warm to room temperature before use.
2. Using the supplied protein re-suspension buffer, dilute (or dissolve) your protein/antibody to a final concentration of 0.5 mg/ml.

Note: For effective conjugation, the purity of the protein needs to be considered. Any other molecules containing primary amines (e.g. TRIS) or other contaminating proteins (e.g. BSA) may compete with the protein to be conjugated and hence severely reduce the conjugation efficiency and should therefore be avoided. Consider using BSA Removal Kit for Nanoparticle Conjugation (SR-08-01).

3. In a microcentrifuge tube combine your diluted protein with reaction buffer according to the table below.

	3 or 10 Small Scale Reaction Format Kits	Midi Kits
Reaction Buffer	84µl	840µl
Diluted Protein Solution	24µl	240µl
Total Volume	108µl	1080µl

4. Transfer 90µl of your protein/reaction buffer mix prepared in step 2 to one of the vials containing lyophilized NHS-activated gold nano-urchins and immediately mix well by pipetting up and down.

Note: Do not resuspend the lyophilized NHS-activated gold nanourchins in buffer prior to addition of protein. NHS rapidly hydrolyzes in aqueous solution and may result in loss of conjugation efficiency.

5. Incubate the vial at room temperature for 2 hours.

6. Add 10µl of quencher solution to the vial to stop the reaction.
7. Using a microcentrifuge, centrifuge the vial for 30 minutes using the appropriate speed for the gold nano-urchin size you are using according to the table below.

Gold NanoUrchin Diameter	Centrifugation Force
50nm	2,000 x g
60nm	1,125 x g
70nm	900 x g
80nm	600 x g
90nm	500 x g
100nm	400 x g

8. Remove supernatant containing unbound protein.
9. Add 100ul of gold conjugate storage buffer* to the vial to re-suspend your conjugate.

* **Note:** A gold conjugate storage buffer is not supplied with the kit. Use a standard biological buffer compatible with your protein.

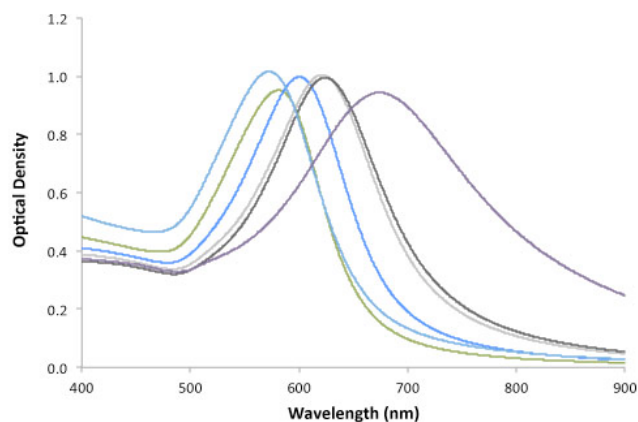
A recommended storage buffer for an antibody gold conjugate is 20mM Tris (pH 8.0), 150mM NaCl supplemented with 1% (w/v) BSA.

10. Record the UV-VIS spectra of the conjugate using a spectrophotometer, and dilute to desired optical density using gold conjugate storage buffer.
11. Store your protein conjugate at 4°C until use.

Your conjugate is now ready for use!

Table II. Gold nano-urchin specifications by size. Please note that all values below are indicated at an optical density of 1 (OD/cm^{-1}) at their respective lambda max. At other optical densities the values needs to be adjusted (e.g. NPS/ml (@OD2) = 2 x NPS/ml (@OD1)).

Diameter (nm)	Peak SPR Wavelength (nm)	NPS/ml	Wt. Conc. (mg/ml)	Molar Ext ($M^{-1}cm^{-1}$)	Size Dispersity (+/-nm)	Particle Volume (nm^3)	Surface Area (nm^2)	Surface/Volume Ratio	Particle Mass (g)	Molar Mass (g/mol)	Molar Conc.
50	585	3.51E+10	4.45E-02	1.72E+10	<8%	6.54E+04	7.85E+03	0.12	1.27E-15	7.64E+08	5.83E-11
60	585	1.96E+10	4.30E-02	3.07E+10	<10%	1.13E+05	1.13E+04	0.1	2.19E-15	1.32E+09	3.25E-11
70	600	1.20E+10	4.17E-02	5.03E+10	<10%	1.80E+05	1.54E+04	0.086	3.48E-15	2.10E+09	1.99E-11
80	620	7.82E+09	4.06E-02	7.70E+10	<10%	2.68E+05	2.01E+04	0.075	5.20E-15	3.13E+09	1.30E-11
90	630	5.37E+09	3.97E-02	1.12E+11	<8%	3.82E+05	2.54E+04	0.067	7.40E-15	4.46E+09	8.92E-12
100	680	3.84E+09	3.89E-02	1.57E+11	<8%	5.24E+05	3.14E+04	0.06	1.02E-14	6.11E+09	6.37E-12



Catalogue Number	Description	Sizes
GUN10K-50-X*	50nm NHS-Activated Gold NanoUrchin Conjugation Kit	3 reactions, 10 reactions, MIDI Kit
GUN10K-60-X*	60nm NHS-Activated Gold NanoUrchin Conjugation Kit	3 reactions, 10 reactions, MIDI Kit
GUN10K-70-X*	70nm NHS-Activated Gold NanoUrchin Conjugation Kit	3 reactions, 10 reactions, MIDI Kit
GUN10K-80-X*	80nm NHS-Activated Gold NanoUrchin Conjugation Kit	3 reactions, 10 reactions, MIDI Kit
GUN10K-90-X*	90nm NHS-Activated Gold NanoUrchin Conjugation Kit	3 reactions, 10 reactions, MIDI Kit
GUN10K-100-X*	100nm NHS-Activated Gold NanoUrchin Conjugation Kit	3 reactions, 10 reactions, MIDI Kit

*X Indicates quantity, i.e. -1 for a 3-reaction kit, -2 for a 10-reaction kit and -3 for a MIDI kit.
For custom sizes and information on bulk quantities and prices please contact our customer service department.

Ordering Information

For ordering call 866-344-3954 or visit us online at www.cytodiagnosics.com