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Product Information

GOLD COLLOIDS AND GOLD CONJUGATES

GOLD COLLOID (see page 2)

APPEARANCE: Clear dark red liquid

EXTINCTION COEFFICIENT: Certificate of Analysis reports absorbance and gold content of product.

CONCENTRATION: Approximately 0.01% as HAuCl_4

STABILITY/STORAGE:

Store at 2-8 °C for up to 18 months. Freezing may cause aggregation. Sodium azide (0.02%) has been added as preservative. Once stabilized with protein, the solution may be supplemented with an antibacterial agent and stored at 2-8 °C.

CERTIFICATE OF ANALYSIS: Lot specific Certificate of Analysis is available.

CHOOSING A PARTICLE SIZE:

Generally, particles <15 nm are most useful in transmission electron microscopy (TEM) and for applications where access to the probe may be hindered by larger particles.⁴¹ Particles >15 nm are more suitable for scanning electron microscopy (SEM), light microscopy and blotting. Sigma's gold colloids are all monodisperse (the coefficient of variance of the particle size is <15% of the mean particle size). In electron microscopy, monodisperse particles facilitate quantitation and allow for dual labeling with different particle sizes.⁴²

GENERAL GUIDELINES FOR USAGE:

The proper pH and concentration must be determined for each protein selected to complex with the gold.^{43,44} The tannic acid in the gold sol must be broken down to reduce its masking effects.²⁷ After ligand adsorption, final blocking of the sol may be done with polyethylene glycol (PEG), BSA or gelatin.⁴⁵ After stabilization of the gold (by reacting with protein), excess ligand should be removed by centrifugation or chromatography, and aggregates should be removed by centrifugation.^{44,46}

GOLD COLLOIDS AND GOLD CONJUGATES

DESCRIPTION:

Colloidal gold is an electron-dense, non-fading marker useful as a probe in electron microscopy (TEM and SEM), light microscopy and blotting.²⁶ It requires no additional processing for detection, but in some applications the signal can be enhanced by reaction with silver.^{4,40} It can be complexed with biomolecules by strong, non-covalent interactions.¹ All unconjugated gold colloids offered by Sigma contain about 0.01% HAuCl₄ suspended in 0.01% tannic acid with 0.04% trisodium citrate, 0.26 mM potassium carbonate and 0.02% sodium azide as preservative; all are produced by a modified tannic acid method of Slot and Geuze.²⁷

GOLD COLLOIDS		
PRODUCT NO.	NAME - DESCRIPTION	PARTICLE SIZE
G-1402	Gold Colloid	Spec: 5 nm Mean: 3-6 nm (monodisperse)
G-1527	Gold Colloid	Spec: 10 nm Mean: 8-12 nm (monodisperse)
G-1652	Gold Colloid	Spec: 20 nm Mean: 17-23 nm (monodisperse)

GOLD COLLOIDS AND GOLD CONJUGATES

GOLD-ANTIBODY CONJUGATES (see page 4)

APPEARANCE: Clear dark red liquid

EXTINCTION COEFFICIENT: Certificate of Analysis reports absorbance and gold content of product.

STABILITY/STORAGE:

Store at 2-8 °C for up to 18 months.

Sodium azide (0.05%) has been added as preservative.

CERTIFICATE OF ANALYSIS: Lot specific Certificate of Analysis is available.

CHOOSING A PARTICLE SIZE:

Generally, particles <15 nm are most useful in transmission electron microscopy (TEM) and for applications where access to the probe may be hindered by larger particles.⁴¹ Particles >15 nm are more suitable for scanning electron microscopy (SEM), light microscopy and blotting. Sigma's gold colloids are all monodisperse (the coefficient of variance of the particle size is <15% of the mean particle size). In electron microscopy, monodisperse particles facilitate quantitation and allow for dual labeling with different particle sizes.⁴²

GENERAL GUIDELINES FOR USAGE:

Gold-conjugated antibodies should be diluted for most applications using 0.5 M NaCl buffered at pH 6-8 with 0.1% BSA, 0.05% Tween 20 and 50% fetal bovine serum to minimize background staining. For most applications dilutions may range from $A_{520}=1.0-0.05$ (1:5-1:100 dilution), Incubation times range from 0.5-12 hours.

DESCRIPTION:

Gold-antibody conjugates are used to detect antigens and require no additional reagents, unless silver enhancement is used to increase assay sensitivity. These products are typically used as probes in electron and light microscopy and immunoblotting procedures.^{2,3,4} All antibodies are conjugated to gold by a modification of Geoghagan's method.¹ Conjugates are tested for immunoreactivity using the dot blot assay of Brada and Roth.⁴ These products are supplied as suspensions in 20% glycerol with 1% BSA, 0.02 M Tris buffered saline, pH 8.0 and 0.05% sodium azide.

GOLD COLLOIDS AND GOLD CONJUGATES

GOLD-ANTIBODY CONJUGATES		
PRODUCT NO.	NAME - DESCRIPTION	HOST ANIMAL
G-0786	Affinity Isolated Antibody to Human IgG (γ-chain specific) 5 nm colloidal gold labeled (monodisperse) Antibody adsorbed with mouse serum proteins.	Goat
G-0911	Affinity Isolated Antibody to Human IgM (μ-chain specific) 10 nm colloidal gold labeled (monodisperse)	Goat
G-5402	Affinity Isolated Antibody to Goat IgG (whole molecule) 10 nm colloidal gold labeled (monodisperse)	Rabbit
G-7652	Affinity Isolated Antibody to Mouse IgG (whole molecule) 10 nm colloidal gold labeled (monodisperse)	Goat
G-7527	Affinity Isolated Antibody to Mouse IgG (whole molecule) 5 nm colloidal gold labeled (monodisperse) Antibody adsorbed with human serum proteins	Goat
G-7777	Affinity Isolated Antibody to Mouse IgG (whole molecule) 10 nm colloidal gold labeled (monodisperse) Antibody adsorbed with human serum proteins.	Goat
G-5652	Affinity Isolated Antibody to Mouse IgM (μ-chain specific) 10 nm colloidal gold labeled (monodisperse)	Goat
G-7402	Affinity Isolated Antibody to Rabbit IgG (whole molecule) 10 nm gold colloid labeled (monodisperse)	Goat
G-7277	Affinity Isolated Antibody to Rabbit IgG (whole molecule) 5 nm gold colloid labeled (monodisperse) Antibody adsorbed with human serum proteins.	Goat
G-3779	Affinity Isolated Antibody to Rabbit IgG (whole molecule) 10 nm gold colloid labeled (monodisperse) Antibody adsorbed with human serum proteins.	Goat
G-7035	Affinity Isolated Antibody to Rat IgG (whole molecule) 10 nm gold colloid labeled (monodisperse) Antibody adsorbed with human serum proteins.	Goat

GOLD COLLOIDS AND GOLD CONJUGATES

GOLD-CONJUGATES OF OTHER PROTEINS (see pages 6)

APPEARANCE: Clear dark red liquid

EXTINCTION COEFFICIENT: Certificate of Analysis reports absorbance and gold content of product.

STABILITY/STORAGE:

Store at $-20\text{ }^{\circ}\text{C}$ or at $2-8\text{ }^{\circ}\text{C}$ (depending on product) for up to 18 months.

Some of the products may be stored undiluted at $-20\text{ }^{\circ}\text{C}$, but diluted samples should not be stored below $0\text{ }^{\circ}\text{C}$, since freezing may cause aggregation of the colloid.

Unless otherwise stated in the description of an individual product number, sodium azide (0.02%) has been added as preservative.

CERTIFICATE OF ANALYSIS: Lot specific Certificate of Analysis is available.

CHOOSING A PARTICLE SIZE:

Generally, particles $<15\text{ nm}$ are most useful in transmission electron microscopy (TEM) and for applications where access to the probe may be hindered by larger particles.⁴¹ Particles $>15\text{ nm}$ are more suitable for scanning electron microscopy (SEM), light microscopy and blotting. Sigma's gold colloids are all monodisperse (the coefficient of variance of the particle size is $<15\%$ of the mean particle size). In electron microscopy, monodisperse particles facilitate quantitation and allow for dual labeling with different particle sizes.⁴²

GENERAL GUIDELINES FOR USAGE:

Gold-conjugated proteins should be diluted for most applications. It is recommended that the diluent buffer contain 0.15 M saline buffered at pH 6-8, plus 0.5% albumin and 0.05% Tween 20 to minimize background. Additional buffer supplements may be required for certain applications. Prior to application, allow the conjugate to equilibrate for at least 20 minutes in lower glycerol content. The optimum concentration of the conjugate should be determined empirically; a typical range is $A_{520}=1.0-0.05$ ($1:5-1:100$ dilution). Incubation times range from $0.5-12$ hours.

DESCRIPTION:

Gold conjugates are processed, after adsorption with proteins, to remove free protein and large aggregates. The concentration is expressed as absorbance at the absorption maximum (A_{520}).^{4,42}

GOLD COLLOIDS AND GOLD CONJUGATES

GOLD CONJUGATES OF OTHER PROTEINS		
PRODUCT NO.	NAME - DESCRIPTION	PARTICLE SIZE
E-6275	<p>ExtrAvidin Gold Labeled ExtrAvidin, a uniquely modified avidin reagent, combines the high specific activity and sensitivity of avidin with the low background staining of streptavidin. ExtrAvidin conjugates may be used in conjunction with biotinylated reagents in the avidin/biotin labeling system. Suspension in 20% glycerol with 0.1 M phosphate buffered saline, pH 7.2, 1% bovine serum albumin, and 15 mM sodium azide</p>	Spec: 10 nm Mean: 8-12 nm (monodisperse)
P-6730	<p>Protein A Gold Labeled Extracellular Protein A (P-6031) adsorbed to colloidal gold.²¹ Suspension in 20% glycerol with 0.01 M phosphate buffered saline, pH 7.4, 1% bovine serum albumin, and 15 mM sodium azide.</p>	Spec: 10 nm Mean: 8-12 nm (monodisperse)
P-6855		Spec: 20 nm Mean: 17-23 nm (monodisperse)
P-1546	<p>Protein G Gold Labeled Protein G (P-9659) adsorbed to colloidal gold.^{22, 23} Suspension in 50% glycerol with 0.15 M NaCl, 0.01 M Tris, pH 7.4, 0.02% PEG 20 and 0.02% sodium azide.</p>	Spec: 5 nm Mean: 3.5-6.5 nm (monodisperse)
S-4188	<p>Streptavidin Gold Labeled Streptavidin (S-4762) adsorbed to colloidal gold.²⁴ Suspension in 20% glycerol with 0.01 M phosphate buffered saline, pH 7.2-7.4, 0.02% PEG 20 and 15 mM sodium azide.</p>	Spec: 5 nm Mean: 3.5-6.5 nm (monodisperse)
S-9059		Spec: 10 nm Mean: 8-12 nm (monodisperse)

GOLD COLLOIDS AND GOLD CONJUGATES

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14. KEY TO SUGAR SPECIFICITY:
 β -gal(163)galNAc: 2-acetamido-2-deoxy-3-O- β -D-galactopyranosyl-D-galactopyranose
 α -man: α -D-mannose
 α -glc: α -D-glucose
galNAc: N-acetyl-D-galactosamine
(glcNAc)₂: N-acetyl-D-glucosamine dimer
NeuNAc: N-acetylneuraminic acid
 α -L-fuc: α -L-fucose
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