

## Adsorbing Antibodies to Nanopartz Spherical Gold Nanoparticles for use in Lateral Flow

### Part Numbers:

CL - Lateral Flow products

### Introduction

Adsorbing antibodies to citrate-stabilized spherical gold nanoparticles (AuNPs) is a common procedure in nanobiotechnology, often used in the development of biosensors, diagnostics, and therapeutics. Below is a general protocol for adsorbing antibodies to citrate-stabilized spherical gold nanoparticles.

### Important Product Information

In order to minimize these reversible occurrences, please make sure to store and handle your product as recommended in the Storage and Handling Instructions.

### Materials

Citrate-stabilized spherical gold nanoparticles (AuNPs)

Antibodies (specific to your target)

Phosphate-buffered saline (PBS)

Bovine serum albumin (BSA) or other blocking agent

Centrifuge

Microcentrifuge tubes

pH meter or pH paper

Tween-20 (optional)

Sonicator: Branson 5510 Ultrasonic Cleaner/Water bath or a Cole Parmer 08890-01 42kHz 1-2 Amps

Mixer: Table top mixer, typically a pad with a touch activated rotation device.

### Procedure

1. Preparation of Gold Nanoparticles:

[www.nanopartz.com](http://www.nanopartz.com)

- a. Ensure your gold nanoparticles are well-dispersed and free from aggregates. If necessary, sonicate the nanoparticle suspension for a few minutes to achieve a uniform dispersion.
2. Adjusting pH:
  - a. Adjust the pH of the AuNP solution to the optimal pH for antibody adsorption. This is typically around pH 7-8. You can use a dilute NaOH or HCl solution to adjust the pH.
3. Antibody Preparation:
  - a. Dilute the antibody to the desired concentration in PBS. Typical concentrations range from 0.1 mg/mL to 1 mg/mL.
4. Mixing Antibodies with AuNPs:
  - a. Slowly add the antibody solution to the AuNP solution while gently stirring. The typical volume ratio of AuNPs to antibody solution is 9:1.
  - b. For example, if you have 900  $\mu$ L of AuNPs, add 100  $\mu$ L of antibody solution.
  - c. Stir gently to ensure thorough mixing.
5. Incubation:
  - a. Allow the mixture to incubate at room temperature for 1-2 hours. This allows the antibodies to adsorb onto the surface of the gold nanoparticles.
6. Blocking (Optional but Recommended):
  - a. To prevent non-specific binding, add BSA or another blocking agent to the mixture. A common concentration is 1% BSA.
  - b. Incubate for an additional 30 minutes to 1 hour at room temperature.
7. Washing:
  - a. Centrifuge the mixture at the correct speed for 10-20 minutes to pellet the antibody-conjugated AuNPs.
  - b. Carefully remove the supernatant and resuspend the pellet in PBS. This step removes unbound antibodies and excess blocking agent.
  - c. Repeat the washing step 2-3 times to ensure thorough removal of unbound materials.

### 8. Storage:

- a. After the final wash, resuspend the antibody-conjugated AuNPs in a small volume of PBS with 0.01% Tween-20 (optional, to prevent aggregation).
- b. Store the conjugated nanoparticles at 4°C. Avoid freezing.

### Important Considerations:

1. **Antibody Concentration:** Optimizing the concentration of antibodies is critical. Too high a concentration can lead to aggregation, while too low a concentration might not provide sufficient coverage.
2. **Blocking Agents:** BSA is commonly used, but other blocking agents can be used depending on the application and compatibility.
3. **Stability:** Monitor the stability of the antibody-conjugated AuNPs over time. Some formulations might require additional stabilizing agents.
4. **Troubleshooting:**
5. **Aggregation:** If aggregation occurs, try lowering the concentration of antibodies or adjusting the pH. Additionally, ensure that the washing steps are gentle to prevent physical disruption of the conjugates.
6. **Low Yield:** If the yield of functional antibody-conjugated AuNPs is low, consider optimizing the incubation time, antibody concentration, and washing conditions.

This protocol provides a general framework for adsorbing antibodies to citrate-stabilized gold nanoparticles. Depending on your specific application and the characteristics of the antibodies and nanoparticles, some optimization might be necessary.