Electronic Supplementary Material (ESI) for Analyst.


# Supporting Information:

# Chemical Modification of Antibody Enables pH Independent Formation of Stable Antibody-Gold Nanoparticle Conjugates for Biosensing

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**Table S1.** Stability of mouse anti-rabbit IgG in 1% (w/v) NaCl solution using the varying conjugation techniques at a pH range of 6-8.5. pH vs hydrodynamic diameter measured with DLS.

| | Hydrodynamic Diameter (nm) | | | | | |
|---|---|---|---|---|---|---|
| **pH** | **Direct** | **0.5 mM DTSSP** | **1 mM DTSSP** | **5 mM DTSSP** | **0.5 mM Acrylic acid (NHS)** | **5 mM Acrylic acid (NHS)** |
| **6** | 95 ± 1 | 79.3 ± 0.3 | 80.3 ± 0.5 | 151 ± 2 | 80.3 ± 0.2 | 229 ± 4 |
| **6.5** | 84.3 ± 0.6 | 79.6 ± 0.2 | 79 ± 0.9 | 144 ± 2 | 80 ± 1 | 227 ± 3 |
| **7** | 79.1 ± 0.6 | 77.6 ± 0.7 | 80 ± 1 | 153 ± 2 | 76 ± 1 | 303 ± 23 |
| **7.5** | 79.3 ± 0.6 | 75 ± 1 | 80.8 ± 0.8 | 281 ± 1 | 75.3 ± 0.3 | 256 ± 10 |
| **8** | 77.7 ± 0.6 | 73.9 ± 0.3 | 113 ± 1 | 436 ± 15 | 75.3 ± 0.6 | 223 ± 15 |
| **8.5** | 76.7 ± 0.6 | 75.7 ± 0.7 | 120 ± 2 | 525 ± 18 | 77.5 ± 0.3 | 358 ± 13 |

**Table S2.** Stability of rabbit anti-mouse IgG in 1% (w/v) NaCl solution using the varying conjugation techniques at a pH range of 6-8.5. pH vs hydrodynamic diameter measured with DLS.

| | Hydrodynamic Diameter (nm) | | | | | |
|---|---|---|---|---|---|---|
| **pH** | **Direct** | **0.5 mM DTSSP** | **1 mM DTSSP** | **5 mM DTSSP** | **0.5 mM Acrylic acid (NHS)** | **5 mM Acrylic acid (NHS)** |
| **6** | 688 ± 20 | 510 ± 14 | 266 ± 9 | 95.5 ± 0.6 | 352 ± 10 | 103 ± 1 |
| **6.5** | 652 ± 23 | 486 ± 8 | 274 ± 3 | 93.4 ± 0.6 | 398 ± 8 | 114 ± 1 |
| **7** | 584 ± 12 | 478 ± 3 | 261 ± 14 | 84.6 ± 0.3 | 421 ± 4 | 129 ± 3 |
| **7.5** | 619 ± 9 | 447 ± 5 | 223 ± 14 | 84.8 ± 0.2 | 427 ± 5 | 130 ± 2 |
| **8** | 502 ± 16 | 457 ± 9 | 204 ± 7 | 70.5 ± 0.7 | 454 ± 6 | 118 ± 2 |
| **8.5** | 508 ± 13 | 439 ± 11 | 160 ± 4 | 71.2 ± 0.4 | 433 ± 7 | 104.1 ± 0.6 |

**Table S3.** Avian influenza viruses and subtypes.

| AIV Isolate | Subtype |
|---|---|
| A/blue winged teal/Illinois/10OS1546/2010 | H3N6 |
| A/duck/Ukraine/63 | H3N8 |
| A/blue winged teal/Iowa/10OS2411/2010 | H3N8 |
| A/duck/Chabarovsk/1610/72 | H3N8 |
| A/shorebird/Delaware Bay/211/1994 | H1N3 |
| A/duck/Alberta/35/76 | H1N1 |

**Table S4.** AIV antibodies screened for intra-subtypic binding.

| Antibody | Species | Reactivity |
|---|---|---|
| PA5-34930 | rabbit | H3 |
| PA5-34924 | rabbit | H3 |
| 11703-RP02 | rabbit | H1 |
| 11684-RP02 | rabbit | H1 |
| 11055-RP03 | rabbit | H1 |
| 9B70 | mouse | H1 |
| 9B71 | mouse | H1 |

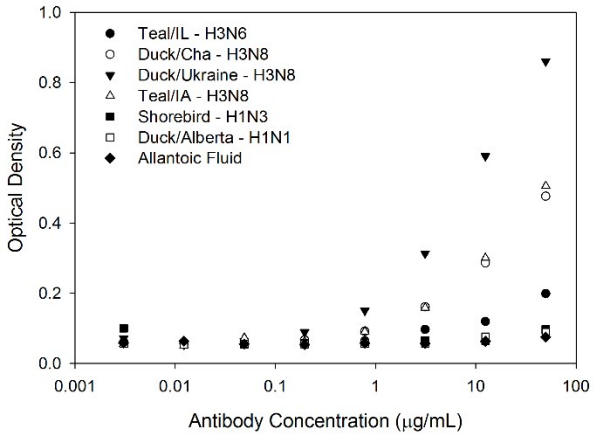


**Figure S1.** ELISA screening rabbit polyclonal anti-H3 (PA5-34930) for binding AIV isolates.