

# A method to prevent SARS-CoV-2 IgM false positives in gold immunochromatography and enzyme-linked immunosorbent assays

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## ABSTRACT

**Objective:** To investigate the interference factors that lead to false-positive novel coronavirus (SARS-CoV-2) IgM detected using gold immunochromatography assay (GICA) and enzyme-linked immunosorbent assay (ELISA) and the corresponding solutions.

**Methods:** GICA and ELISA were used to detect SARS-CoV-2 IgM in 86 serum samples, including 5 influenza A virus (Flu A) IgM-positive sera, 5 influenza B virus (Flu B) IgM-positive sera, 5 *Mycoplasma pneumoniae* IgM-positive sera, 5 *Legionella pneumophila* IgM-positive sera, 6 sera of HIV infection patients, 36 rheumatoid factor IgM (RF-IgM)-positive sera, 5 sera from hypertensive patients, 5 sera from diabetes mellitus patients, and 14 sera from novel coronavirus infection disease (COVID-19) patients. The interference factors causing false-positive reactivity in the two methods were analyzed, and the urea dissociation test was employed to dissociate the SARS-CoV-2 IgM-positive serum using the best dissociation concentration.

**Results:** Two methods detected positive SARS-CoV-2 IgM in 22 middle-high level RF-IgM-positive sera and 14 sera from COVID-19 patients; the other 50 sera were negative. When urea dissociation concentration was 6 mol/L, SARS-CoV-2 IgM were positive in 1 middle-high level RF-IgM-positive sera and in 14 COVID-19 patient sera detected using GICA. When urea dissociation concentration was 4 mol/L and the avidity index (AI) lower than 0.371 was set to negative, SARS-CoV-2 IgM were positive in 3 middle-high level RF-IgM-positive sera and in 14 COVID-19 patient sera detected using ELISA.

**Conclusion:** Middle-high level of RF-IgM could lead to false-positive reactivity of SARS-CoV-2 IgM detected using GICA and ELISA, and urea dissociation tests would be helpful in reducing false-positive results of SARS-CoV-2 IgM.