# RUBELLA IGG AVIDITY TEST

- The commercial kit (Euroimmun Rubella ELISA IgG Avidity kit, cat # EI2590-9601-1G) determines avidity of rubella IgG by comparing ELISA results of a set of wells in the presence of a denaturant to the results of the wells without the denaturant.

- If the IgG antibodies are low avidity, they will be washed off by the denaturant.

- A relative avidity index (RAI) is calculated and expressed in percent using the O.D. values with and without the denaturant.

  RAI < 40%:   Indication of low-avidity antibodies
  RAI 40% - 60%: Intermediate Range
  RAI > 60%:   Indication of high-avidity antibodies

TEST DESCRIPTION AND INTERPRETATION

- Rubella IgG avidity is based on the maturation of IgG subclasses from weak binding IgG antibodies to strong binding IgG antibodies.

- Avidity is the strength of binding of antibodies to antigen.

- When a patient's immune system is challenged with an antigen, in this case rubella virus, the first response is the production of IgM antibodies. IgG antibodies which are produced shortly afterward are of low avidity followed by IgG antibodies of progressively higher avidity.

- That is, avidity increases over time. By measuring the avidity of IgG antibodies, it can be determined if the infection was fairly recent or not.

- IgG antibodies can develop into strong binding antibodies in as short as 30 days.

- It is imperative for the interpretation of a high avidity result to note the clinical history of the patient (including date of symptom onset, travel history, contact with known rubella cases) when submitting specimens for testing.

- A low rubella IgG avidity result indicates that there has been a recent primary rubella infection in the patient. Using this assay, maturation from low to intermediate/high avidity occurs >30 days after exposure/infection to rubella virus. Therefore, for the interpretation of a high avidity result as a true past infection, and not a primary infection, the exposure date and serum collection date must be <30 days apart.

- The rubella IgG avidity assay is particularly useful for confirming acute rubella infections in pregnant women.

- Primary rubella infection occurring in the first trimester of a pregnancy has a high risk of the fetus/child developing serious congenital abnormalities (Congenital Rubella Syndrome, CRS). Reinfections / re-exposure to rubella virus in a pregnant woman has a significantly lower or minimal risk of CRS. Thus differentiation of primary from past rubella infections is very important from the patient management perspective.

- For example, a rubella IgM positive result would be further supported as a true acute rubella infection if the rubella avidity assay showed the presence of low avidity antibodies. Conversely, a high avidity IgG result would indicate that the IgM result may be a false positive, or that the patient has a rubella reinfection. In both of these latter cases, the risk of CRS in a pregnant woman is significantly reduced compared with a primary rubella infection occurring in the first trimester of pregnancy. However, in order to correctly interpret the high avidity result, the exposure date must be known.

Rubella avidity post-vaccination pregnant women
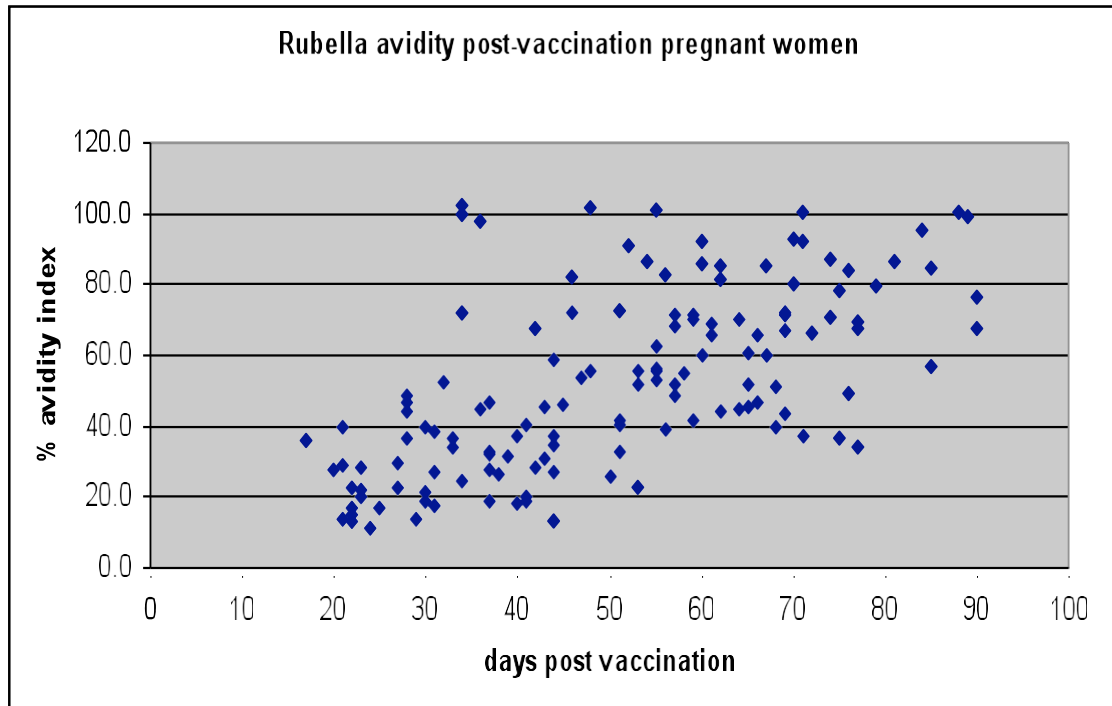
Reference: Unpublished Laboratory Data, Brazil Study; Tipples G. 2006

REPORTING THE RESULTS

- When specimens are submitted to the Viral Exanthemata and STDs Lab at the NML, clinical history of the patient (including date of symptom onset, travel history, contact with known rubella cases, pregnancy status) is required.
- If there is no onset date, travel history, or known contact with a rubella case, please indicate such on the requisition.

Any questions regarding testing can be directed to the Viral Exanthemata Section at the National Microbiology Laboratory by calling 204-789-6024 or 204-789-7055

REFERENCES

1. Mubareka S. et. al. Evaluation of Commercial Rubella Immunoglobulin G Avidity Assays. J Clin Micro. 2007:45;231-233
2. Robinson L. J. et. al. Prevention of Congenital Rubella Syndrome-What Makes Sense in 2006. Epidemiologic Reviews. 2006:28;81-87
3. Best M. J. et. al. Interpretation of rubella serology in pregnancy-pitfalls and problems. BMJ Clinical Review. 2002:325;147-148
4. Test Instruction: Avidity Determination of IgG antibodies against Rubella viruses, Euroimmum. 2010
5. NML Guide to Services: https://cnphi.canada.ca/gts/reference-diagnostic-test/5270?labId=1016
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