

Test Summary

Immune Cell Function

Clinical Use

- Monitor cell-mediated immunity in immunosuppressed individuals

Clinical Background

Cell-mediated immunity is expressed by T-lymphocytes through direct cytotoxicity and the release of lymphokines. The functions of cell-mediated immunity include the destruction of fungi and tumor cells and the elimination of viral infections. In addition, cell-mediated immunity is responsible for graft-versus-host disease in allograft recipients.

Transplant recipients generally require prolonged treatment with immunosuppressive agents to prevent rejection of the allograft. Correct dosing of immunosuppressives is critical. Over-medicating may leave the individual susceptible to infections or lead to drug toxicity, while under-dosing can lead to shortened graft survival due to the immune response to the transplanted tissue.^{1,2} Though immunosuppressive drug levels are routinely monitored, they do not always correlate with the degree of immunosuppression.^{1,2} Additionally, many current in vitro methods used to study cell-mediated immunity (eg, cytokine production and lymphoproliferation) are unsuitable for clinical practice because they require long turnaround-times or are unreliable at predicting graft rejection.²

This assay measures the increase in intracellular ATP production that occurs in T-lymphocytes within 24 hours of stimulation by antigens or mitogens.³ Recent studies indicate that this ATP level correlates with T-lymphocyte activity and, consequently, cell-mediated immune function, thus making ATP a useful clinical indicator of cell-mediated immune function.⁴⁻⁹

Individuals Suitable for Testing

- Individuals receiving immunosuppressive therapy

Specimen Requirements

1 mL room-temperature whole blood (sodium heparin, green-top tube); 0.5 mL minimum

Specimen must be received and enter processing within 30 hours of collection. Contact your local Quest Diagnostics laboratory for specific instructions, or e-mail immunefunction@questdiagnostics.com.

Method

- Phytohemagglutinin stimulation of lymphocyte ATP production
- Magnetic separation of CD4 positive T-lymphocytes
- Chemiluminescent measurement of ATP level
- Analytical sensitivity: 1 ng/mL
- Analytical specificity: ATP produced by CD4 positive T-lymphocytes
- Aliases: Immuknow™, Lymphocyte Stimulation
- CPT code*: 86353

Reference Range

See Table

Interpretive Information

The ATP ranges in the table are correlated with cell-mediated immune function (see Table).⁵⁻⁹ An ATP level between 226-524 ng/mL indicates a level of cell-mediated immunity at which the risk for both infection and rejection is at a minimum. It is the desired ATP range for transplant recipients on immunosuppressive therapy.⁵⁻⁹

Results may be unreliable in some patients immediately following transplantation because of immune system instability caused by surgical trauma, anesthesia, transfusion, immunosuppressive therapy, or very low CD4 count.⁵ Results should be interpreted in conjunction with other laboratory and clinical findings.

Table. Correlation of ATP Level with Immune Response⁵⁻⁹

ATP Range (ng/mL)	Immune Response	Interpretation	
		Risk of Infection	Risk of Rejection
≤225	low	increased	decreased
226-524	moderate	decreased	decreased
≥525	strong	decreased	increased

References

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