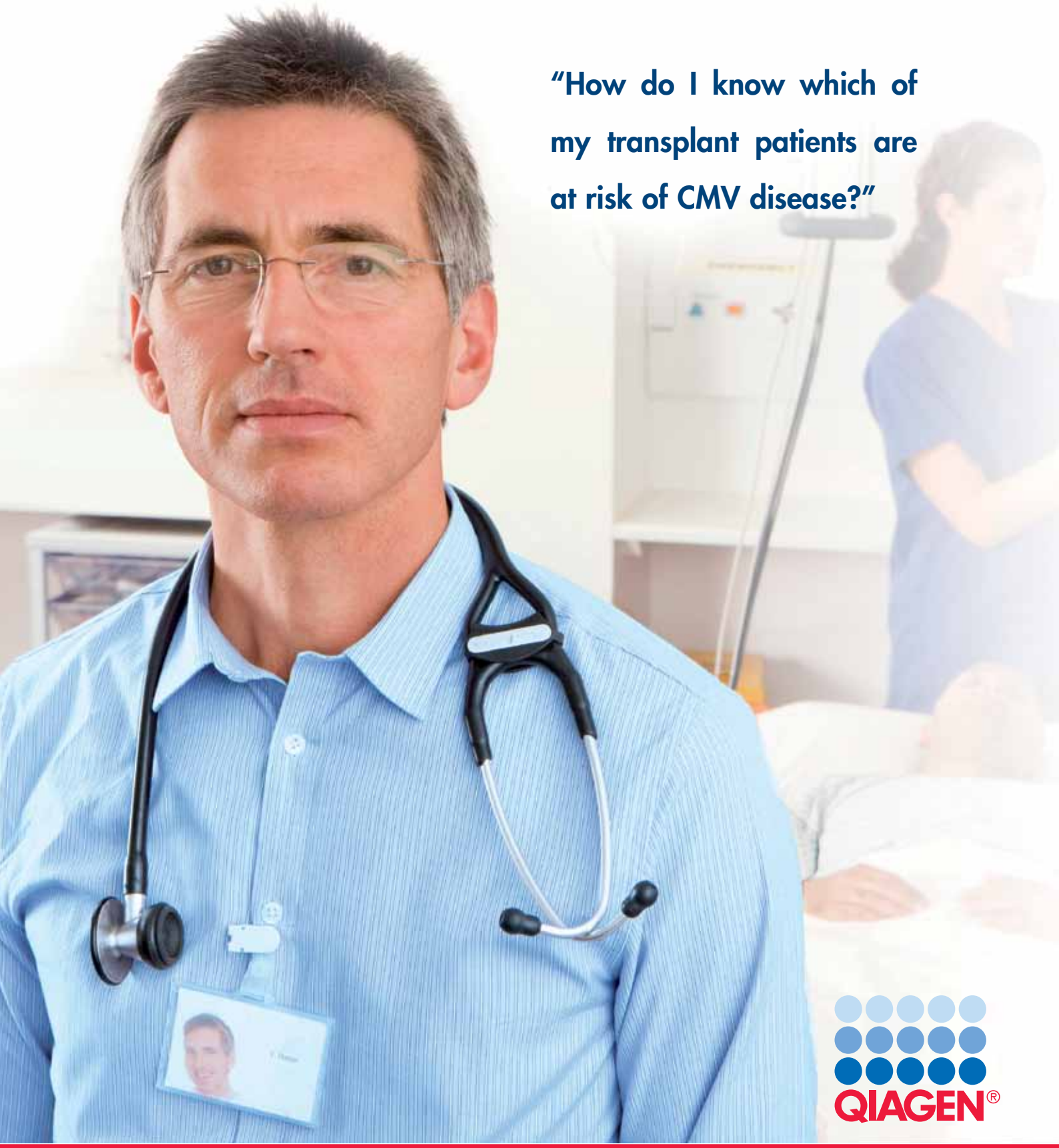
CMV-specific immune monitoring test

QuantiFERON®-CMV



"How do I know which of my transplant patients are at risk of CMV disease?"

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Which transplant patients are at risk of CMV disease post-prophylaxis?

Current immunosuppressive therapies used to prevent the rejection of a transplanted organ have detrimental effects upon the T-lymphocytes and cell-mediated immune responses in solid organ transplant (SOT) recipients. These patients have an increased susceptibility to viral infections post-transplant.[2, 3] Approximately half of these patients show signs of active Cytomegalovirus (CMV) infection (ie. viral replication) after completion of antiviral prophylaxis.[1]

Consequently, CMV-associated morbidity and mortality in transplant recipients are very high.[3–5] Infection can result not only in organ-specific conditions affecting the brain, lungs, and liver, but also in opportunistic infections, increased allograft rejection, and patient death. These CMV-related complications add an estimated 49% to the cost of transplant care.[6]

The immune status of the transplant recipient can influence the (re)activation of CMV in transplant recipients. A specific cytokine marker for cellular immune responses, interferon-gamma (IFN-γ) plays a key role.[7, 8] Secreted from CMV-specific T-cells in response to antigens associated with CMV infection,[8, 9] IFN-γ levels may indicate a patient's overall level of cell-mediated immunity.

Cytomegalovirus (CMV) is the most common and problematic viral infection in solid organ transplant recipients.

How can QuantiFERON-CMV help identify at-risk patients?

QuantiFERON-CMV uses specialized (1 mL) blood collection tubes that are coated with peptides simulating $CD8^+$-specific epitopes of CMV proteins, along with negative and positive control tubes. Stimulation of CD8+ T-cells in whole blood with the CMV peptides results in the production of IFN-γ in infected individuals. An enzyme-linked immunosorbent assay (ELISA) is then used to measure the amount of IFN-γ present in plasma from each of the three tubes (Nil control, CMV-antigen, and Mitogen control). A robust IFN-γ response in the CMV antigen tube is indicative of immunity to CMV.[11]

Immunity to CMV during Post-Transplantation prophylaxis

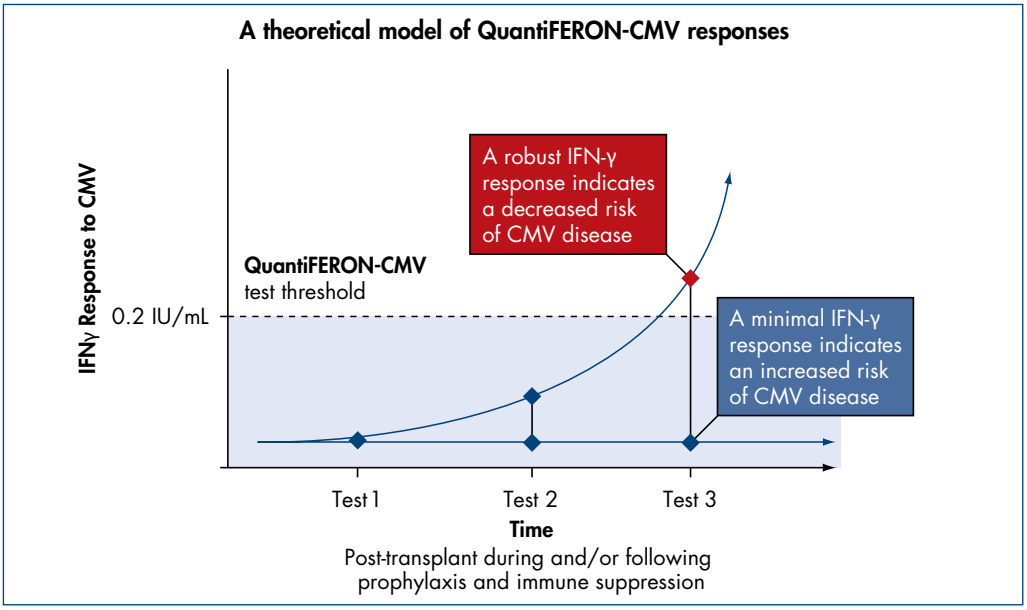

Figure 1. A theoretical model of QuantiFERON-CMV responses in a post-transplant setting during and/or following prophylaxis and immune suppression.

Freedom from CMV-related events

Patients who have a cellular immune response to CMV at the end of prophylaxis have a significantly lower risk of developing CMV disease than those who do not have a detectable immune response. This indicates that QuantiFERON-CMV may predict the development of late-onset CMV disease in transplant recipients. [8, 10–13]

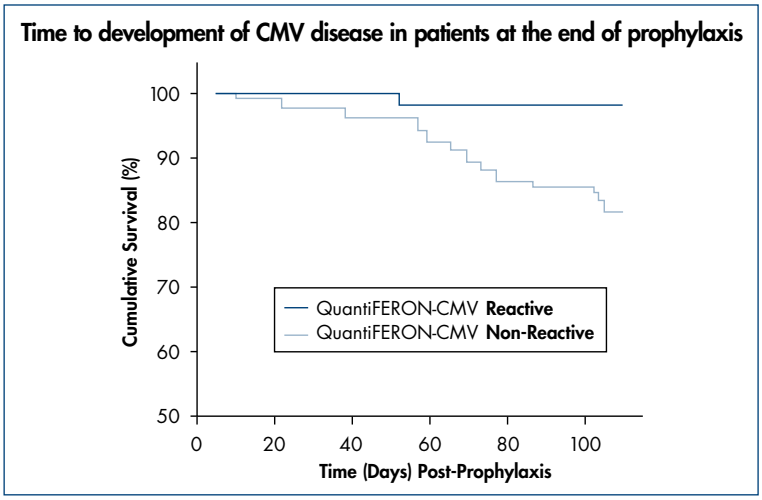

Figure 2. Time to development of CMV disease in patients with a QuantiFERON-CMV Reactive result versus a QuantiFERON-CMV Non-Reactive result at the end of prophylaxis. Data reproduced from Kumar *et al.*[11]

Patients with a positive QuantiFERON-CMV test remain free from CMV disease significantly more often and for longer than patients with a negative QuantiFERON-CMV after cessation of antiviral prophylaxis.

Clinical confidence

QuantiFERON-CMV may assist[13] your ability to:

- Predict the risk of new and recurrent CMV disease
- Guide therapeutic decision-making
- Improve patient health.

QuantiFERON-CMV is not a direct test for determining CMV infection and should not solely be used to exclude CMV infection.

The accuracy, efficacy, and utility of QuantiFERON-CMV for monitoring CMV-related changes in cell-mediated immunity has been demonstrated in numerous studies.[8, 10–13]

New international consensus guidelines on the management of CMV in SOT

The recently-published "International Consensus Guidelines on the Management of Cytomegalovirus in solid organ transplantation" [14] suggest that an ideal immune monitoring assay should:

- Assess the quantity and function of a transplant recipient's $CD4^+$ and $CD8^+$ T-cells
- Be able to measure interferon-γ
- Be simple to perform, cost-effective, and reproducible
- Have a rapid turnaround time
- Allow for specimens to be easily shipped to specialized referral laboratories.

QuantiFERON-CMV meets virtually all the criteria specified by the guidelines above and is the only standardized, commercially-available immune monitoring assay that is specific for CMV.[14]

Studies now highlight that monitoring a patient's level of cellular immunity to CMV using QuantiFERON-CMV could help guide the optimal duration of costly anti-CMV prophylaxis in high-risk patients.[8, 10, 11, 13–16]

About QuantiFERON® Technology

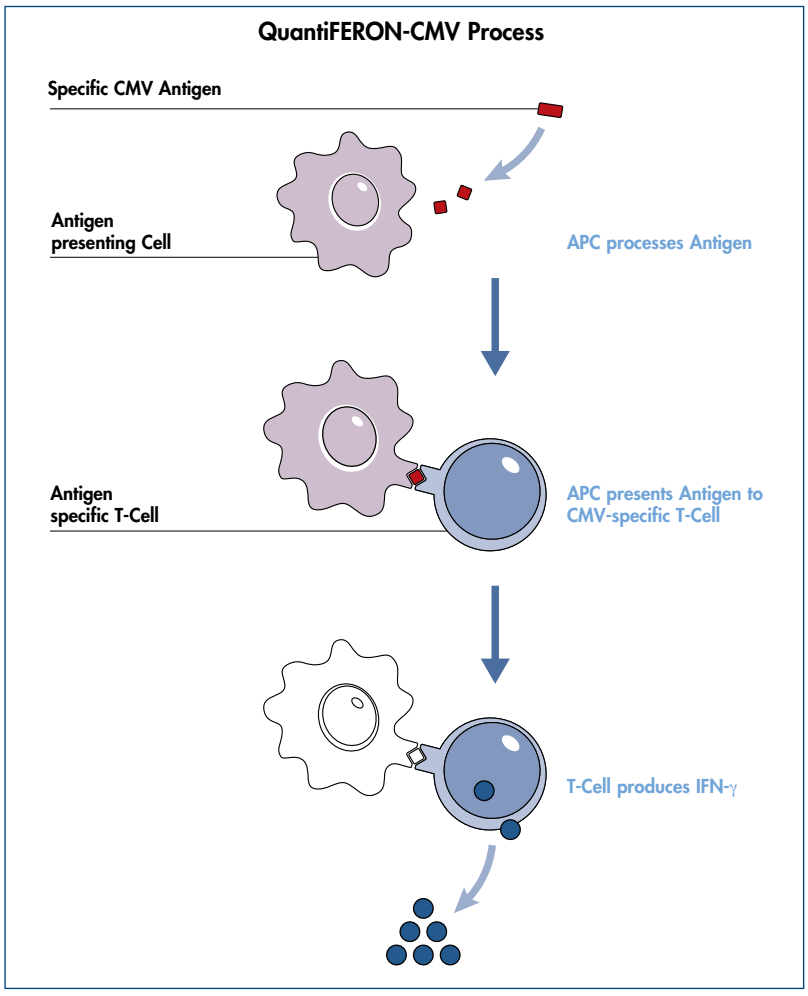

Figure 3. Diagram illustrating the QuantiFERON-CMV process.

QuantiFERON Technology is a unique approach to disease detection and monitoring—the only *in vitro* diagnostic technology available for detection of cell-mediated immune responses from whole blood samples.

Individuals exposed to CMV and other diseases have specific T-cell lymphocytes in their blood. These T-cells are a memory bank of an individual's immune system, recognizing antigens to which the T-cells have been previously exposed. When a disease-specific antigen is combined with the blood of an individual who has been exposed to that disease, a rapid re-stimulation of the T-cells with specific memory of that antigen occurs. These antigen-specific T-cells respond by secreting IFN-γ, which can be measured as a specific marker of immune response against that disease antigen.

QuantiFERON-CMV is not US FDA-approved and is limited to research use only in the United States.

QuantiFERON-CMV is CE Marked for commercial use in Europe.

References

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