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**Accurate Monitoring by QC-PCR of Changes in Circulating HIV-1 Levels in Patients in Response to Antiviral Therapy**, M. Piatak, Jr.[1], L.-M. Yang[1], S.J. Clark[2], J.C. Kappes[2], K.-C. Luk[1], B.H. Hahn[2], G.M. Shaw[2], E.A. Emini[3], J.D. Lifson[1], and M.S. Saag[2]. [1]Genelabs Incorporated, Redwood City, CA, USA 94063, [2]The University of Alabama at Birmingham, Birmingham, AL, USA 35294, and [3]Merck Sharpe and Dohme Research Laboratories, West Point, PA, USA 19486.

Quantitative Competitive PCR (QC-PCR) methods were used to determine plasma virus levels in sequential samples from HIV-1 infected patients undergoing treatment with zidovudine. QC-PCR methods can accurately determine viral RNA copy numbers with a standard deviation of +/- 22%. For one group of patients, sequential samples from before and after initiation of treatment with zidovudine were analyzed for virus RNA by QC-PCR, for free and immune complex dissociated p24, for infectious virus titer by endpoint dilution culture, and for absolute counts of CD4+ T-cells. Treatment with zidovudine resulted in 2 to 39-fold deceases in virus RNA copy number measured by QC-PCR. These results correlated well with changes in infectious virus titers, although the absolute levels of virus determined by each method were less comparable, perhaps owing to differences in the proportion of culturable virus in different specimens. Decreases in circulating p24 anitgen levels were both less consistent and of lesser magnitude. In another group of 3 patients initiating zidovudine treatment ($200 < CD4+ \text{ T-cells} < 500/mm^3$) serial samples were evaluated covering a two week period with no antiviral treatment followed by six weeks treatment with zidovudine and a one week follow-up after temporary discontinuation of treatment. Two of these patients had negative virus culture and p24 assay results and thus could be monitored only by QC-PCR. After initiation of zidovudine treatment, virus RNA levels declined rapidly by up to 20-fold but also rebounded as rapidly, reaching pretreatment levels following discontinuation of treatment. These results dramatically demonstrate the dynamic nature and high levels of ongoing virus replication in these patients. They also demonstrate the explicit utility of the QC-PCR approach in accurately monitoring changes in viral load in response to therapeutic intervention.