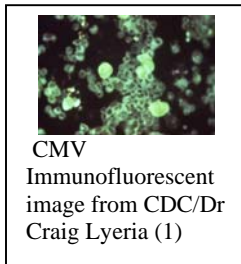


## Cytomegalovirus (CMV) Detection with real time PCR reagents

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### Overview:



CMV is the cause of “heterophile negative infectious mononucleosis” and rarely is the cause of serious, even life threatening infections including: encephalitis, systemic multiorgan disease, retinitis especially in the immune suppressed, and fetal infection. The common specimens include: urine, bronchoalveolar lavage, and blood.

CMV belongs to a large, diverse herpesvirus group of dsDNA, enveloped viruses, with an icosahedral nucleocapsid.

Herpesviruses are frequent causes of illness and readily detected by PCR. This group includes diseases of man, mice, cows, whales, seals, rabbits, birds, fish, turtles, and many others. The human diseases are caused by infection with the following: Herpes simplex virus (HSV), Epstein-Barr virus (EBV), Cytomegalovirus (CMV), varicella-zoster virus (VZV), HHV6, 7, and 8. These herpes viruses are more aggressive in immune suppressed and neonates, but on occasion, cause serious disease in otherwise normal people.

Primers and probe are available for amplification and detection of CMV. The CMV primers are specific for an 87 bp portion of the UL122 gene. The CMV detection probe is a molecular beacon. (2)

**Products**

<b>Products</b>	<b>Catalog No.</b>	<b>Quantity</b>
<b>CMV FAM-BHQ1</b> <i>Store at -20C. 25- 20 µl reactions</i> <i>Typical use: Add 2X master mix and DNA, then thermal cycle.</i> <i>Attostar reagent contains primers and probe.</i> <i>Detection at 510nm.</i>	<b>PP1500</b>	<b>0.055ml</b>
<b>AttoMaster 2X Mix for qPCR</b> <i>Store at -20°C. 125-20 ul reactions</i> <i>Contains Taq polymerase (requires heat activation), dNTPs (0.4 mM) with optimal dUTP to dTTP ratio, heat labile UDG, Mg(6 mM), and buffer.</i> <i>Typical use: Add Attostar Primer-probe, DNA, and then thermal cycle.</i>	<b>AM10</b>	<b>1.25 ml</b>
<b>CMV Plasmid</b> <i>(Store at -20C.)</i> <i>Typical use: make serial 10 fold dilutions in TE for standard curve, diluting 5 ul into 45 ul TE buffer.</i>	<b>PLAS1500</b>	<b>0.25ml</b>

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**Detection of CMV DNA:**

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**Thermal cycle conditions for PCR reactions on RotorGene\***

\*Similar cycle conditions and reaction volumes may be used on many other thermal cyclers.

25°C 10 min (UDG treatment time)  
95°C 120 sec (activation for AttoMaster polymerase)  
40 cycles  
    95°C 15 seconds  
    60°C 30 seconds RotorGene Channel Setup FAM/Sybr, Cy5; Gain 7  
    72°C 30 seconds

FAM/Sybr has a source of 470nm and Detector 510nm (LightCycler use F1)  
Cy5 has a source of 625nm and Detector 660hp nm  
Quasar 670 has the same fluorescent absorption and emission as Cy5.

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**Thermal cycle conditions for PCR reactions on LightCycler**

25°C 10 min (UDG treatment time)  
95°C 120 sec (activation for AttoMaster polymerase)  
40 cycles  
    95°C 15 seconds  
    60°C 30 seconds acquire fluorescent signal on F1 gain =1  
    72°C 30 seconds  
40°C 30 seconds cool

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**Use of the CMV plasmid:**

Dilute the plasmid in TE to prepare a standard curve. Common dilutions would be 10-fold from 200 to 0.002pg/ml. The 0.02 pg/ml plasmid dilution contains 12 copies of plasmid in 2 µl.

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**Attostar Primers/probe PP1500 RotorGene-PCR 20µl reactions**

RotorGene Reagents needed for 20 ul PCR final reaction tube volumes										
Reaction tube number	1	2	3	4	5	6	7	8	9	10
Attostar Primer-Probe FAM labeled (10X)	2	4	6	8	10	12	14	16	18	20 µl
Master mix (2X)	10	20	30	40	50	60	70	80	90	100 µl
Dispense 12 ul / reaction tube										
Add 8 ul DNA / reaction tube										

**Attostar Primers/probe PP1500 LightCycler-PCR 20 µl reactions**

LightCycler Reagents needed for 20 ul PCR final reaction tube volumes										
Reaction tube number	1	2	3	4	5	6	7	8	9	10
Attostar Primer-Probe (10X)	2	4	6	8	10	12	14	16	18	20 µl
Master mix (2X)	10	20	30	40	50	60	70	80	90	100 µl
BSA 1 mg/ml	1	2	3	4	5	6	7	8	9	10 µl
Dispense 13 ul / reaction tube										
Add 7 ul DNA / reaction tube										

.....

**Extraction / amplification control with T4 bacteriophage**

Adding T4 bacteriophage (BAC130) to the sample provides DNA for extraction, amplification, and reaction condition PCR controls.

When added to a sample, T4 adds a known amount of DNA. The T4 DNA can then be extracted, amplified, and detected as a control. T4 controls for the efficiency of DNA extraction, the presence of PCR amplification inhibitors, intact amplification reagents ( DNA polymerase, buffer, dNTPs), and instrument function (thermal cycling and fluorescent detection system).

The T4 DNA may be detected in a separate PCR reaction (using FAM labeled T4 probe in PP100). Or the T4 DNA and test organism DNA may be detected using a multiplex reaction (using Quasar 670 labeled T4 probe in PP160 and FAM labeled test organism probe).

**Brief procedure for use of T4 as extraction and amplification control:**

- Add 5µl T4 bacteriophage to the sample. Proceed with DNA extraction. Dilutions of the bacteriophage may be made to give a final PCR Ct value that is about 35. At this dilution, the phage is more sensitive, i.e. more likely, to detect a poor extraction or the presence of PCR inhibitors in the reaction.

Please refer to the BAC130, PP100, and PP160 product literature.

**T4 multiplex reaction (PP160)**

**RotorGene Multiplex PCR 20µl reactions**

Multiplex Reagents needed for 20 ul PCR final reaction tube volumes										
Reaction tube number	1	2	3	4	5	6	7	8	9	10
Attostar Primer-Probe PP160	2	4	6	8	10	12	14	16	18	20 µl
Primer-Probe mix for TEST organism	2	4	6	8	10	12	14	16	18	20 µl
2 x master mix	10	20	30	40	50	60	70	80	90	100 µl
Dispense 14 ul / reaction tube										
Add 6 ul DNA / reaction tube										

Reaction tube number	11	12	13	14	15	16	17	18	19	20
Attostar Primer-Probe PP160	22	24	26	28	30	32	34	36	38	40 µl
Primer-Probe mix for TEST organism	22	24	26	28	30	32	34	36	38	40 µl
2 x master mix	110	120	130	140	150	160	170	180	190	200 µl
Dispense 14 ul / reaction tube										
Add 6 ul DNA / reaction tube										

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**Reference:**

- 1) Immunofluorescent image from CDC/Dr Craig Lyeria
- 2) <http://www.molecular-beacons.org/Introduction.html>

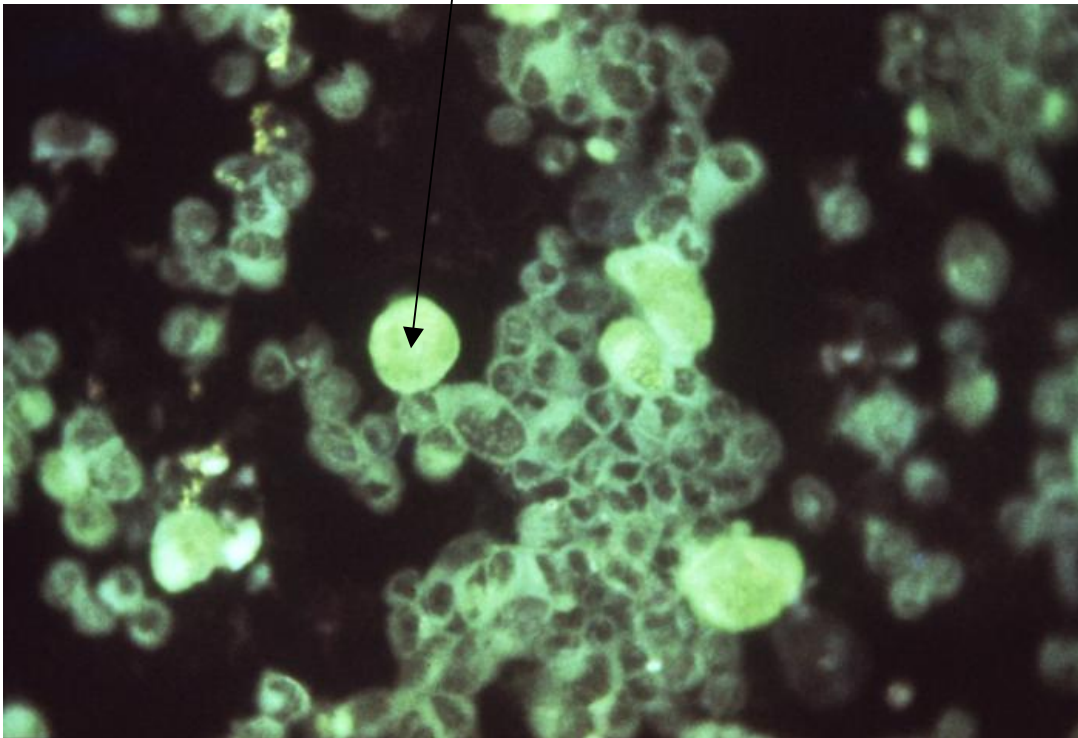
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**Enlarged image (1):**

Fluorescent cells with inclusions.



10-18-07