

# PrimePCR™ Assay Validation Report

## Gene Information

Gene Name	X-box binding protein 1
Gene Symbol	XBP1
Organism	Human
Gene Summary	This gene encodes a transcription factor that regulates MHC class II genes by binding to a promoter element referred to as an X box. This gene product is a bZIP protein which was also identified as a cellular transcription factor that binds to an enhancer in the promoter of the T cell leukemia virus type 1 promoter. It may increase expression of viral proteins by acting as the DNA binding partner of a viral transactivator. It has been found that upon accumulation of unfolded proteins in the endoplasmic reticulum (ER) the mRNA of this gene is processed to an active form by an unconventional splicing mechanism that is mediated by the endonuclease inositol-requiring enzyme 1 (IRE1). The resulting loss of 26 nt from the spliced mRNA causes a frame-shift and an isoform XBP1(S) which is the functionally active transcription factor. The isoform encoded by the unspliced mRNA XBP1(U) is constitutively expressed and thought to function as a negative feedback regulator of XBP1(S) which shuts off transcription of target genes during the recovery phase of ER stress. A pseudogene of XBP1 has been identified and localized to chromosome 5.
Gene Aliases	TREB5, XBP2
RefSeq Accession No.	NC_000022.10, NT_011520.12, NG_012266.1
UniGene ID	Hs.437638
Ensembl Gene ID	ENSG00000100219
Entrez Gene ID	7494

## Assay Information

Unique Assay ID	qHsaCID0010491
Assay Type	SYBR® Green
Detected Coding Transcript(s)	ENST00000216037, ENST00000403532, ENST00000405219, ENST00000344347
Amplicon Context Sequence	CAAGCGCTGTCTTAACCTCCTGGTTCTCAACTACAAGGCCATGAGTTTCTCTCGT AAAAGCTGATTTCTAGCAAAGTTTTGGTTCTCTCTAAATCTACCACTTG CTGTTCCAGCTCACTATTGAGCCTTCTTCGAT
Amplicon Length (bp)	116
Chromosome Location	22:29193107-29195103
Assay Design	Intron-spanning
Purification	Desalted

## Validation Results

Efficiency (%)	94
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R <sup>2</sup>	0.999
cDNA Cq	18.49
cDNA Tm (Celsius)	80
gDNA Cq	31.69
Specificity (%)	100

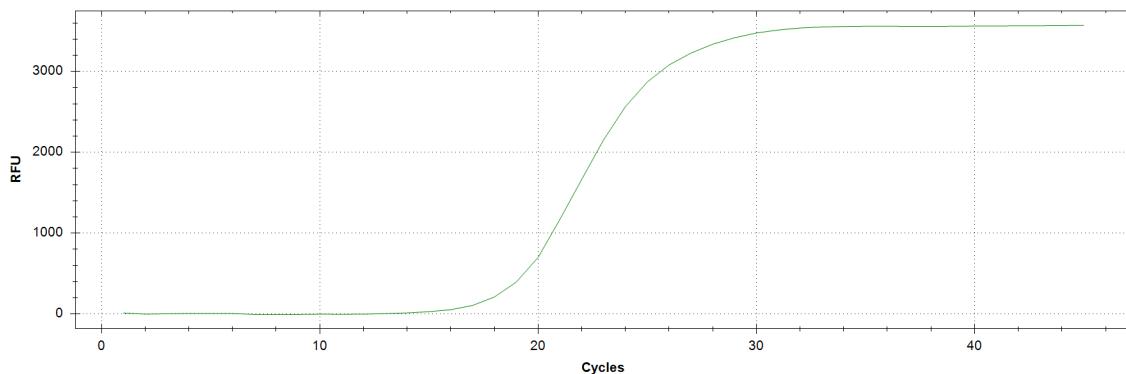
Information to assist with data interpretation is provided at the end of this report.

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XBP1, Human

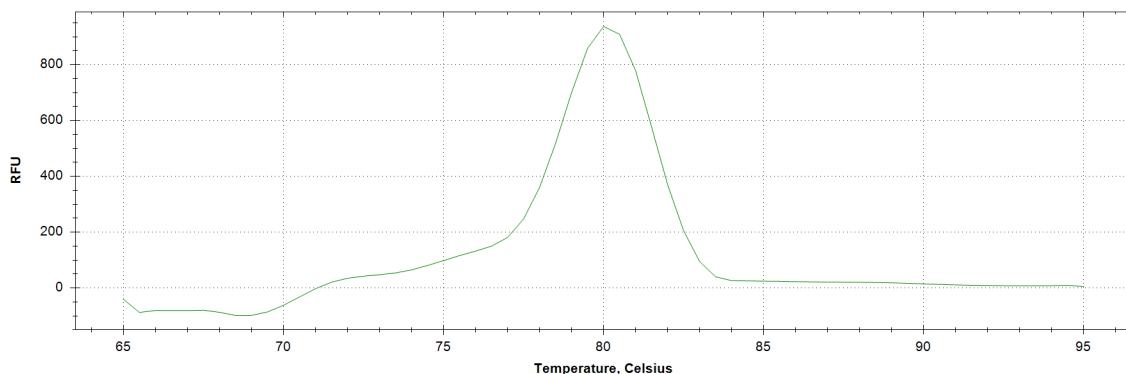
## Amplification Plot

Amplification of cDNA generated from 25 ng of universal reference RNA



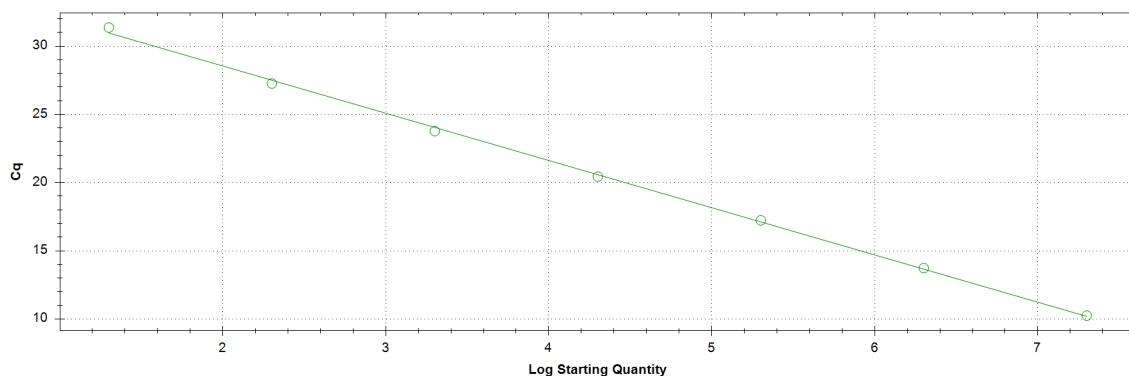
## Melt Peak

Melt curve analysis of above amplification



## Standard Curve

Standard curve generated using 20 million copies of template diluted 10-fold to 20 copies



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Products used to generate validation data

<b>Real-Time PCR Instrument</b>	CFX384 Real-Time PCR Detection System
<b>Reverse Transcription Reagent</b>	iScript™ Advanced cDNA Synthesis Kit for RT-qPCR
<b>Real-Time PCR Supermix</b>	SsoAdvanced™ SYBR® Green Supermix
<b>Experimental Sample</b>	qPCR Human Reference Total RNA

## Data Interpretation

<b>Unique Assay ID</b>	This is a unique identifier that can be used to identify the assay in the literature and online.
<b>Detected Coding Transcript(s)</b>	This is a list of the Ensembl transcript ID(s) that this assay will detect. Details for each transcript can be found on the Ensembl website at <a href="http://www.ensembl.org">www.ensembl.org</a> .
<b>Amplicon Context Sequence</b>	This is the amplicon sequence with additional base pairs added to the beginning and/or end of the sequence. This is in accordance with the minimum information for the publication of real-time quantitative PCR experiments (MIQE) guidelines. For details, please refer to the following publication, "Primer Sequence Disclosure: A Clarification of the MIQE Guidelines" (Bustin et al 2011).
<b>Chromosome Location</b>	This is the chromosomal location of the amplicon context sequence within the genome.
<b>Assay Design</b>	<p>Exonic: Primers sit within the same exon in the mRNA transcript and can potentially co-amplify genomic DNA. If performing gene expression analysis, it is suggested that the samples be treated with a DNase to eliminate potential unwanted signal from contaminating genomic DNA.</p> <p>Exon-exon junction: One primer sits on an exon-exon junction in mRNA. When performing gene expression analysis, this design approach will prevent unwanted signal from contaminating genomic DNA.</p> <p>Intron-spanning: Primers sit within different exons while spanning a large intron in the mRNA (intron is greater than 750bp). When performing gene expression analysis, this design approach should limit potential unwanted signal from contaminating genomic DNA.</p> <p>Small intron-spanning: Primers sit within different exons with a short intron in between (intron is smaller than 750bp). Small introns may not prevent unwanted signal from contaminating genomic DNA.</p>
<b>Efficiency</b>	Assay efficiency was determined using a seven-point standard curve from 20 copies to 20 million copies. While an efficiency of 100% represents a perfect doubling of template at every cycle and is ideal, typical ranges of good assay efficiency are between 90-110%. For difficult targets, assay efficiency outside of this range are accepted and reported accordingly.
<b>R<sup>2</sup></b>	The R <sup>2</sup> represents the linearity of the standard curve and how well the standard curve data points fit the linear regression line. Acceptable values are >0.98.

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<b>cDNA Cq</b>	Cq value obtained from 25ng of cDNA transcribed from universal RNA when performing wet-lab validation of the assay.  Note: Not all genes will be expressed at a detectable level in the universal RNA sample.
<b>cDNA Tm</b>	Melting temperature of the amplicon when running a melt curve analysis.
<b>gDNA Cq</b>	Cq value obtained when running the assay with 2.5ng of genomic DNA. This is more than a moderate level of genomic DNA contamination. Intron-spanning and exon-exon junction assay designs can minimize or eliminate genomic DNA detection.  Note: Genomic DNA contamination is often present at variable levels. If concerned about genomic DNA contamination, the genomic DNA contamination control assay is recommended to run with your sample to determine if genomic DNA levels are sufficient to negatively impact results.
<b>Specificity</b>	This value is the percent of specific amplicon reads as measured by next generation sequencing (NGS). While 100% specificity is desirable, small decreases in specificity (<1%) can be due to NGS read errors. More significant reductions are likely due to co-amplification of homologous regions.  Note: Since gene expression can be cell type and condition specific, the exact level and impact of co-amplification in a given sample is impossible to predict. If co-amplification is detected, it should be taken into consideration and reported when analyzing gene expression results.