

**U.S. Veterinary Immune Reagent Network
Primer Pairs Used for Cloning Target Sequences
September 3, 2008**

- The primer pairs listed have been used to generate specific PCR products that have been confirmed by sequencing.
- Primer pairs marked “Complete CDS” in the **Coding Sequence** column flank the entire coding region, including the signal sequence.
- Primer pairs marked “Partial CDS” are described in the **Coding Sequence** column as information is available.
- Empty primer slots indicate targeted genes for which confirmed primers are not yet available.

Primers by Species

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CATFISH

Gene	Forward Primer	Reverse primer	Product size (bp)	Coding Sequence
CD4-1	CATGTCAACTGGTACTTCCAGG	GGAGGCGAGATCTACAATGATG	477	Partial CDS
IFN type 1	AACGCGAACATGGACATCAA	CGACGTGGGAAAGAGGTGTTTCCTG	193	Partial CDS
IFN type 2	GGAATGATGGCGTACTCTGAGG	CTACACCTTAAAGCACCTCC	541	Partial CDS
IgD membrane form	GGAGCACACCATCTCTAAAACC	TTGACCAGAGTCACTGAACATCCAT	779	Partial CDS
IgL F class	GTCTCTGCTCCCTCCCTC	GACAAACTCCTCCCCCTTTTCC	228	
IgL G class	CCAGCCCAGTGTGACGGTGTTG	AGGAGGTTGGTTGTCCTTGAG	288	
IgL sigma class	CGGATCCTGTTCTGACCGTT	CTTTAACATCTATAAGCCTTTGCTG	699	
IgM membrane form	GCAAAGCGCCCCGAAATCCC	CTCCATCTCATAGTGGAAGATCTCT	951	
IgM secreted form	CACTGGATCAATGGCACCGAATTCAT	GCAAGGACGCGTCTTTAGATCCT	410	

IpFcRI	AAATGGCAACAGGCTAGGACC	AGCCAATCATGCATATGTATTCA	489	Partial CDS
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CHICKEN

Gene	Forward primer	Reverse primer	Product Size (bp)	Coding Sequence
CCL4	ATGAAGGTCTCTGTGGCTGCCCTCGC	G TTCAGTTC CATCTTGTTCATGT	273 bp	Complete CDS
CCL20	TGCCTGGCTTGAGCACCAAGAGTTTG	TCACATTGACATCCTCTTGAGCTTCT	303 bp	Complete CDS
IFN- γ	ATGACTTGCCAGACTTACAAC TTGTTT	TTAGCAATTGCATCTCCTCTGAGACTGG	495 bp	Complete CDS
IL-1 β	ATGGCGTTTCGTTCCCGACCTGGACGT	TCAGCGCCCACTTAGCTTGTAGGTGGCGA	804 bp	Complete CDS
IL-2	ATGATGTGCAAAGTACTGATCTTTGGCTGT	TTATTTTTGCAGATATCTCACAAAGTTGGTCA	432 bp	Complete CDS
IL-4	CGGGATCCATGAGCTCCTCACTGCCACCCCTGCTGG	CCAAGCTTCTTATTTTTAGCTAGTTGGTGGAAGAAG	411 bp	Complete CDS
IL-10	GGGATCCATGCAGACCTGCTGCCAAGCCCTGTTGC-	CCAAGCTTCTTCTCCTCCTCATCAGCAGGTA CTCTC	528 bp	Complete CDS
IL-12p35	ATGGCAGAGCACGGCATCGGCATCGGCA	TTACATCTCTGCAGTGAGGGCACTCAGGTA	618 bp	Complete CDS
IL-12p40	ATGTCTCACCTGCTATTTGCCTTAC	TTATCTGCAAAGCGTGGACCACTCACTCC	948 bp	Complete CDS
IL-15	ATGCTGGGGATGGCACAGCCAACACA	TTAGTTAGCGTATTTTTGCATTCCCT	564 bp	Complete CDS
IL-16	ATGAGCGAAGACAACAGCCACTTAG	TTACAAAGTTTCAGATGCCTTCTTGGTAAC	1284bp	Complete CDS
IL-17	ATGTCTCCGATCCCTTATTCTCCTCT	TTAAGCCTGGTGCTGGATCAGTGGGGTGAC	510 bp	Complete CDS
IL-17D	ATGCTAATGAATCTTTATTACTTG	TCATTCCGATGACGGCTTGTCTGGTTGA	351 bp	Complete CDS
IL-18	ATGAGCTGTGAAGAGATCGCTGTGTGTG	TCATAGGTTGTGCCTTTCATTATGACTT	597 bp	Complete CDS
Lymphotactin	ATGAAACTCCACGCCACAGTTCTCCTGG	TAAAATCAGAGCCAACAGTACAATAC	860 bp	Complete CDS
MIF	CTATGTTACCATCCACACCAACG	CTATGCAAAGGTGGAACCGTTCCAGCCC	348 bp	Complete CDS
TNFSF15	ATGGATCACGGGGCTGAAATAACCCT	CTACAGTAAAAAGGCACCGAAGAAGGTTT	720 bp	Complete CDS
CD80	CGGGATCCATGAAGATGGGGTGCCTGAAGA	CGGAATTCTCATAGAGATGACATTTACATGTC	951 bp	Complete CDS
CD83	CGGGATCCATGGCTTCAGCAGCCTACACTCTAC	GGAATTCTTAGATAGA ACTTGAAGTAAGTCCACTT	648 bp	Complete CDS
CD86	CGGGATCCATGGAGGTCTGCATATTCTTTCTT	CGGAATTCTTAGACTGCGAGACTGACACTCT	852 bp	Complete CDS
CXCR4	ATGGACGGTTTGGATCTGTCTCTGGCA	TTAGCTGGAATGGAACTTGAAGACTCT	1077 bp	Complete CDS
IL-2R α	ATGGAGCTCAAGCGCCTTTTGATGTGG	TCACAAAAAGACAGCAGAATGGAGAAG	636 bp	Complete CDS
IL-21R	ATGAGGAACAACTATGGCTCCAGAG	TCAGTCTGTCTGAGTCCCCTGGCAGGGC	1773 bp	Complete CDS
LITAF	ATGTCTGCTCCTAGTGGCTTTCCTGC	CTATAAACGCTTATAAGAACCAACGTGGG	447 bp	Complete CDS

EQUINE

Gene	Forward	Reverse	Product Size (bp)	Coding Sequence
CCL2	AAGCCAGAAACCAACAACCTCTC	GATTCTTGGCTTTTGGAGTAGGT	377	Complete CDS
CCL3	ACTCCATCCGCTCAGCATC	AGGTTACGAGGCTGTTTCTAAGG	367	Complete CDS
CCL5	ATGAAGGTCTTCGCAGCTGCCCTGGCGG	CTAGCTCATCTCCAAAGTGTGATGTACTC	276	Complete CDS
CCL11	CCAGAAACCAACAGCTCTCAC	AAGAGCAGGGAAGATGAATCA		Complete CDS
CXCL9	ATGAAGAAAAGTGGTGTTCCTTTC	TTATGTAGCCTTCTTTTGACGAG	381	Complete CDS
CXCL10	ATGAATCAAAGTGCTGTTCTTATAC	TTATACTTCTCTCAGTGTTGAGG	315	Complete CDS
GM-CSF	ATGTGGCTTCAGAACCTGCTTCTTC	CTGATCCCCGCCAGTGAAAATATCC	645	Complete CDS
IFN-alpha	CAGCATCTGCAAGATCCCC	GAACCAGGTGTCATTTCTTCC	599	Complete CDS
IL-1 beta	ATGGCAGCAGTACCCGACACCAGTG	GGCAGAGGTGATTTCCATGATGAAAG	805	Partial (lacks stop codon)
IL-2	ACTACTCACAGTAACCTCAACTCCT	GGGCTTACAAAAGAATCTTAAG	633	Complete CDS
IL-4	ATGGGTCTCACCTACCAACTGATTC	TCAACACTTGGAGTATTTCTCTTTC	414	Complete CDS
IL-5				
IL-6	ATGAACTCCTTCTTCACAAGCACCG	TCCTAACGTCATACTTTTAGTTCT	744	Complete CDS
IL-10	ATGCACAGCTCAGCACTGCTATGTT	TTCACAGAGAAGCTCAGTAAATAAA	739	Complete CDS
IL-12p35				
IL-12p40				
IL-15	GAGAAGTACTTGCATCCAGTGCTAC	AGAAGGGTTGATGAACATTTGCACG	462	Partial CDS
IL-17	ATGGCTCCTCTGAGAACTTCATCCG	TTAACCCATGTGGCGGACAATG		
IL-18	GCAGGAATAAAGATGGCTGC	GCTAGTTCTGGTTTTGAACA	595	Complete CDS
IL-23	AGAGATTCCACAGGGACTGACT	TAGCATTGCTGAGCCATAGATGT	695	Complete CDS
TNF-alpha	ACTTGAGCCCCTCTGGAAAG	GCAGATAATAAAGGGATTGAGGTG	777	Complete CDS

BOVINE

Gene	Forward	Reverse	Product Size (bp)	Coding Sequence
CCL2	GAATCCTCTCGCTGCAACAT	GCTCAAGGCTTTGGAGTTTG	320	Complete CDS
CCL5	CCATGAAGGTCTCTGCCACT	CCACCCTAGCTCAACTCCAA	283	Complete CDS
CCL11	TCAGGAATCAGCAGCTCTCAG	ACCAAGCCTTTTGAGGCTCTTTA	400	Complete CDS
CCR7	ATGGACCTGGGGAAGC	CTACGGGGAGAAGGTGGT	1140	Complete CDS
CXCL9	GGAGTGATTTACCCCTACCAA	GGTGAAGTGGGAGCTCATGTA	414	Complete CDS
CXCL10	AGTTGCAGCACCATGAACAA	GCTTCTCTGGTCCATCCTT	358	Complete CDS
CXCL11	CAGCAGCAACAAGCATGAGT	GGTTTTCAGATCCTTTTTCCA	344	Complete CDS
IFN-alpha	CCGGCCTAACTCTCTCTAAA	AAATATTGCAGGCAGGAGGA	547	Complete CDS
IFN-beta	ACAGAGTCACCCACCTCACC	GACCAGGTGTGTGTCAGTCC	629	Complete CDS
IFN-gamma	GTAGCCCTGTGCCGATTTTC	CACATTGTCCCTTCCAGAG	621	Complete CDS
IL-1 beta	CTTCATTGCCAGGTTTCTG	CCCTGGGTATGGCTTTCTTT	847	Complete CDS
IL-2	GTCAGCAATGTACAAGATACAACCTC	GAGAGGCACTTAGTGATCAAGTCA	491	Complete CDS
IL-4	GTCTCACATTGTCAAGTCAAAA	TTCAGCTTCAACACTTGGAGT	450	Complete CDS
IL-5	CCAAGGCAAACGCTGAAC	AACCTCCTTCTCCTCCTCCA	484	Complete CDS
IL-6	CAGCTATGAACTCCCGCTTC	GAGCCCCAGCTACTTCATCC	641	Complete CDS
IL-7	CTGCAGTTGCGGTCATCAT	GCGGATAGATTCTTGGAGGA	634	Complete CDS
IL-8	AACAAGAGCCAGAAGAAACCTG	TCATGGATCTGCTTCTCAGC	349	Complete CDS
IL-10	ATGCATAGCTCAGCACTACTCTGT	TCACCATCCTGGAGGTCTTC	571	Complete CDS
IL-10R				
IL-12p35	ACCGGTCTGCGTCCAACCT	GGGTTATGAGAGACCTCAGCA	744	Complete CDS
IL-12p40	ATGCACCCTCAGCAGTTGGT	CTAACTGCAGGACACAGATGC	984	Complete CDS
IL-13	ATGCGTCTGCTCCTCAATTT	TCAGTTGAATCTTTCATTGCGAA	442	Complete CDS
IL-15	GCAAGGATCCCCATATTTGAGAAGTACTTCCATCCAG	GCAAGGGCCCAAGAAGTGTGATGAACATTTG	491	Partial CDS
IL-17				
IL-18	ATGGCTGCAGAACAAGTAGA	ATCATTTTAATATCTAGTTCTGGTT	595	Complete CDS
IL-23	ATGCTGGGGAACAGAGCTG	TAGGGCTCAGAGTTGCTGC	578	Partial CDS
IL-23R	ATGAATCAGGTCACAATTC	CTACTTTTCTAAGAGTGAAATCCG	1890	Complete CDS
TNF-alpha	TCTCCCGTCTGGACTTGAAC	TCACAGTGCGATGATTCCAAA	743	Complete CDS
TCR alpha	AGAATTGTCAAGGACCCCAACCCCACTGT	AGGGCCCCACCTTCAGGAGGAGGATG		
TCR beta	AAAGCTTCCAAGGTGGCTGTGTTTCAAC	AGGGCCCCAGCAGGATCTCATAGAGGAG		
TCRd V1	TGGCCCAGAAGGTTACTCAAG	GCAAACAGCATTCCGAGCCC	778	Partial CDS
TCRd V2	ATGTCTGTATGCTCTGCC	GCAAACAGCATTCCGAGCCC	857	Partial CDS
TCRd V3	ATGCAGTCTGGACCGCTTC	GCAAACAGCATTCCGAGCCC	839	Partial CDS
TCRd V4	ATGTTTCTCCCTGTGGGCTTC	GCAAACAGCATTCCGAGCCC	790	Partial CDS
TCRg V2-C3	GCATTTGTTGAAATCATTGTG	CCAGGCTAGATTCTGAGCAG	953	Partial CDS
TCRg V8-C3	ACAAGTTGTCAGTCATGAGGGCTA	CCAGGCTAGATTCTGAGCAG	970	Partial CDS
TCRg V3-C5	ATGTCACCATTGGAAGCATTCACA	GATGGAGAAGTAGATCATGC	874	Partial CDS
TCRg V4-C5	CGTTGTGCACTGGTATCAAG	GATGGAGAAGTAGATCATGC	709	Partial CDS
TCRg V7-C5	ATGGCATTCTGGAAGCGGTCTCTC	GATGGAGAAGTAGATCATGC	873	Partial CDS

SWINE

Gene	Forward	Reverse	Product Size (bp)	Coding Sequence
CCL2	ATGAAGGTCTCTGCAGCCCTCCTGTGC	TCAGGCGGCAAGGCTTCGGAGTTT	307	Complete CDS
CCL3L1	ATGAAGGTCGCCGTGGCTGCTCTC	TCAGGCATTCAGCTCCAGGTCAGA	282	Complete CDS
CCL4	ATGAAGCTCTGCGTGACTGTCCTCTCC	TCAGTTCAGTTCCAAGTCATCCA	279	Complete CDS
CCL5				
CXCL9	GACTCAGTGGAACACCTACAGAAGT	CAGAATACTTGTTGGTAACATGGTC	449	Complete CDS
CXCL10	ATGAACCAAAGTGCTGTTCTTATTTTC	TTATGCTTCTCTCTGTGTTGAGG	316	Complete CDS
CXCL11	ATGGGTGTGAAGGGCATGGGC	TCATACATTTTGATATCTTAGG	303	Complete CDS
IFN-alpha	CCCACCTCAGCCAGGACAGAAGCATCT	GTAAGAAGCATTCTATGATGAACCAG	363	Complete CDS
IFN-beta 1				
IL-7	ATGTTCCATGTTTCTTTTAGGTATATC	TCAATATTCTTTAGCACCCCTCAAAT	531	Complete CDS
IL-13	CCAGCCTACAAGTCTGCTCCTCACTCC	TGCCTCAGTTGCCCCCGTGCAAGCCG	707	Complete CDS
TNF-alpha	CAAGCCACTCCAGGACCCCTAGAAAT	CTTTTCTAAACACGCTTTTATTTCTCG	466	Complete CDS

TROUT

Gene	Forward	Reverse	Product Size (bp)	Coding Sequence
IFN1s	GAAACTCATCTGGATAACTAACAGCGAA	ACATGTACAAAAGGGAAATACGAAATA	786	Complete CDS
IFN2	TGGAAAAGCTAAAAGCAAATAAAC	GCACAATACATTTTTATTCACAATTTTC	798	Complete CDS
IFN3	AGCTGTTCCATTCAAGTTCTT	GTTGTACGTATTTTTTATTTAATT	808	Complete CDS
IFNg	ACCGTACACCGATTGAGGAC	CTACACCTAGCCTTCACAGTAGAC	639	Complete CDS
TCRA	GAGAGAAACATGACCCATCTTACTA	GGTCAGGGATAGGAAGTTGATC	260	Partial CDS
TCRB	GATCCAAACATCAAAGTCACTG	GAACTTCCAATCATAACCATGA	483	Partial CDS
TCRG	CACGACACTTTATGTGACAGAT	TCCTCTTCCCAGGATCCT	526	Partial CDS
CD3	AGACAGACAGACCTACTGAGGTG	ATTTTTCTCTTATCTCCTTCTGG	646	Complete CDS
CD4	ATCAGACTGACCAATCAGCAG	GGTCTGTATGATGTCTCTAGTTTCTG	1627	Complete CDS
CD4REL	CCAGGTTTTTGTAACCTAAGAC	AGCAATCACGTTCCAGC	1091	Complete CDS
CD8A	GAGCTTGAACGTGTTGCTGT	ACATGAATCATCTACACAAACCTG	906	Complete CDS
CD28	CTGAGAACTTTCAAGATGAACG	GAACTTGGTCTGTTTCTCCAGTC	831	Complete CDS
CD79A	ATGGTGGCCGTGACATT	CTGGATCTGATCATATGTGGAG	615	Partial CDS
CD79B	TGCAATCTACAGTAGTAATGTTGAC	GAGCATACTGAGATGGTC	621	Partial CDS
CD83	CATTGCTGTAGTTCTACAAATATG	TTCTCTTTATGTTCAAGTATAC	691	Complete CDS
CTLA4/ CD152	TTCTCGTCGTCATGACTCTCA	CTTCATTGGAAGTTCCATAATC	667	Complete CDS
MHC IA	ATGAAGGGTATTATCTTGCTGGT	CAGAGGTCTCTCAAATCTTCTTG	1066	Complete CDS
MHC IIB	ATGTCGATGCCAATTGC	TCAGCCTCAGGCAGGG	641	Complete CDS