**PACLight1P78A DNA sequence:**

ATGAAGACGATCATCGCCCTGAGCTACATCTTCTGCCTGGTGTTCGCCATGGCGGGCGTAGTGCACGTTTCCCTTGCTGCACTGCTCCTCTTGCCAATGGCGCCAGCCATGCACAGTGACTGCATCTTTAAGAAGGAACAAGCTATGTGTCTCGAAAAAATCCAAAGAGCTAATGAGCTTATGGGCTTTAATGATTCTTCACCAGGTTGCCCGGGTATGTGGGATAACATTACATGTTGGAAGCCCGCGCACGTAGGTGAAATGGTATTGGTTTCTTGCGCTGAACTGTTCCGAATTTTTAACCCCGATCAAGTATGGGAAACGGAAACGATTGGTGAAAGTGACTTCGGAGACTCAAATAGTCTGGATCTCTCAGATATGGGTGTGGTCTCTCGGAATTGTACCGAGGATGGCTGGTCCGAGCCGTTTCCGCATTATTTTGACGCATGTGGTTTCGACGAATACGAATCTGAGACCGGAGATCAAGATTACTACTACCTTAGTGTAAAGGCACTGTATACAGTTGGTTACAGTACAAGTCTGGTTACACTCACTACAGCTATGGTAATCTTGTGCAGATTCAGGAAGCTCCATTGTACGCGAAATTTCATTCACATGAATTTGTTCGTGTCTTTTATGCTCCGGGCTATTTCCGTTTTCATTAAAGACTGGATTCTGTACGCAGAGCAGGATTCAAACCATTGTTTCATCAGTACAGTAGAATGTAAGGCAGTAATGGTTTTTTTTCATTACTGCGTGGTTTCCAACTACTTTTGGCTGTTTATAGAAGGTTTGTATCTGTTCACACTTCTGGTTGAAACTAAGAAGAAGGAGCGACGGTACTTCTACTGGTACACAATTATAGGATGGGGCACTCCGACCGTCTGTGTGACAGTATGGGCGACACTCCGGCTTTACTTCGACGACACAGGTTGTTGGGACATGAACGATTCCACGGCTCTCTGGTGGGTAATAAAGGGGCCAGTCGTGGGGAGCATTATGGTTAATTTTGTCCTCTTTATCGGCATTATAGTAATCCTTGTCCAGAAGCTGCAGCTGAGCTCACTCATTAACGTCTATATCAAGGCCGACAAGCAGAAGAACGGCATCAAGGCGAACTTCAAGATCCGCCACAACATCGAGGACGGCGGCGTGCAGCTCGCCTACCACTACCAGCAGAACACCCCCATCGGCGACGGCCCCGTGCTGCTGCCCGACAACCACTACCTGAGCGTGCAGTCCAAACTTTCGAAAGACCCCAACGAGAAGCGCGATCACATGGTCCTGCTGGAGTTCGTGACCGCCGCCGGGATCACTCTCGGCATGGACGAGCTGTACAAGGGCGGTACCGGAGGGAGCATGGTGAGCAAGGGCGAGGAGCTGTTCACCGGGGTGGTGCCCATCCTGGTCGAGCTGGACGGCGACGTAAACGGCCACAAGTTCAGCGTGTCCGGCGAGGGTGAGGGCGATGCCACCTACGGCAAGCTGACCCTGAAGTTCATCTGCACCACCGGCAAGCTGCCCGTGCCCTGGCCCACCCTCGTGACCACCCTGACCTACGGCGTGCAGTGCTTCAGCCGCTACCCCGACCACATGAAGCAGCACGACTTCTTCAAGTCCGCCATGCCCGAAGGCTACATCCAGGAGCGCACCATCTTCTTCAAGGACGACGGCAACTACAAGACCCGCGCCGAGGTGAAGTTCGAGGGCGACACCCTGGTGAACCGCATCGAGCTGAAGGGCATCGACTTCAAGGAGGACGGCAACATCCTGGGGCACAAGCTGGAGTACAACAATCATGACCAACTGAATGAGAGTTCTATATACTTGCGCCTCGCGCGAAGTACACTCCTGCTGATCCCTCTTTTTGGTATACATTACACAGTCTTCGCGTTTAGTCCAGAGAACGTCAGTAAACGCGAAAGACTCGTCTTCGAACTGGGGTTGGGTTCATTTCAGGGGTTCGTCGTTGCAGTACTTTATTGCTTTCTGAATGGCGAAGTCCAAGCAGAAATTAAGCGGAAGTGGCGCTCTTGGAAGGTCAATCGCTATTTCGCCGTGGACTTCAAACATCGCCATCCCAGCTTGGCTTCCTCAGGCGTGAATGGGGGCACGCAGTTGAGTATTCTGTCAAAGAGTTCATCCCAGATTAGAATGTCAGGTCTCCCGGCCGACAACTTGGCCGCATGA

**PACLight1P78A protein sequence:**

MKTIIALSYIFCLVFAMAGVVHVSLAALLLLPMAPAMHSDCIFKKEQAMCLEKIQRANELMGFNDSSPGCPGMWDNITCWKPAHVGEMVLVSCAELFRIFNPDQVWETETIGESDFGDSNSLDLSDMGVVSRNCTEDGWSEPFPHYFDACGFDEYESETGDQDYYYLSVKALYTVGYSTSLVTLTTAMVILCRFRKLHCTRNFIHMNLFVSFMLRAISVFIKDWILYAEQDSNHCFISTVECKAVMVFFHYCVVSNYFWLFIEGLYLFTLLVETKKKERRYFYWYTIIGWGTPTVCVTVWATLRLYFDDTGCWDMNDSTALWWVIKGPVVGSIMVNFVLFIGIIVILVQKLQLSSLINVYIKADKQKNGIKANFKIRHNIEDGGVQLAYHYQQNTPIGDGPVLLPDNHYLSVQSKLSKDPNEKRDHMVLLEFVTAAGITLGMDELYKGGTGGSMVSKGEELFTGVVPILVELDGDVNGHKFSVSGEGEGDATYGKLTLKFICTTGKLPVPWPTLVTTLTYGVQCFSRYPDHMKQHDFFKSAMPEGYIQERTIFFKDDGNYKTRAEVKFEGDTLVNRIELKGIDFKEDGNILGHKLEYNNHDQLNESSIYLRLARSTLLLIPLFGIHYTVFAFSPENVSKRERLVFELGLGSFQGFVVAVLYCFLNGEVQAEIKRKWRSWKVNRYFAVDFKHRHPSLASSGVNGGTQLSILSKSSSQIRMSGLPADNLAA\*

Color legend:

HA secretory sequence

hmPAC1R secretory sequence

Mutations added during optimization

cpGFP