BIOINFORMATICS ASSIGNMENT 1 (Day 1 - 5)

1. **Gene Name:** OXT oxytocin/neurophysin I prepropeptide [Homo sapiens (human)]

2. **Function of the Gene:** This gene encodes a precursor protein that is processed to produce *oxytocin* and *neurophysin I*. Oxytocin is a posterior pituitary hormone which is synthesized as an inactive precursor in the hypothalamus along with its carrier protein neurophysin I. Together with neurophysin, it is packaged into neurosecretory vesicles and transported axonally to the nerve endings in the neurohypophysis, where it is either stored or secreted into the bloodstream. The precursor seems to be activated while it is being transported along the axon to the posterior pituitary. This hormone contracts smooth muscle during parturition and lactation. It is also involved in cognition, tolerance, adaptation and complex sexual and maternal behaviour, as well as in the regulation of water excretion and cardiovascular functions.

3. **NCBI accession number:** NC_000020.11

4. **Forward Primer:** AGAACTCCAGGAGCTGAGCGGATTTT

5. **Reverse primer:** TTTTCACCATTTCTGGGGTGGCTATGG

6. **Features of primers:**

	Sequence (5'->3')	Template strand	Length	Start	Stop	Tm	GC%
Forward primer	AGAACTCCAGGAGCTGAGCGGATTTT	Plus	26	3071861	3071886	66.07	50
Reverse primer	TTTTCACCATTTCTGGGGTGGCTATGG	Minus	27	3072490	3072464	65.42	48.15

7. **Amplicon length:** 630bp

Amplicon sequence:

AGAACTCCAGGAGCTGAGCGGATTTTgacgccccgcccttgaccgcggtc
gaggcccccacggcgccccagcgcgtctcagccccgctgtcccgcccgaa
ctccgaaccccggaccccagcatccttgcccggcgcaccccggccggcct
cgcagggtcctccgagcgagtccccagcgccgccccggctcccgctcacc
ccgcccgtccccgcagtgcctcccctgcggccccgggggcaaaggccgct
gcttcgggcccaatatctgctgcgcggaagagctgggctgcttcgtgggc
accgccgaagcgctgcgctgccaggaggagaactacctgccgtcgccctg
ccagtccggccagaaggcgtgcgggagcgggggccgctgcgcggtcttgg
gcctctgctgcagcccgggtgagcggggcaaggcgctccggggccagggg
gaggcgggcgggggtgcggccgggattcccctgactccacctcttcctcc
agacggctgccacgccgaccctgcctgcgacgcggaagccaccttctccc
agcgctgaaacttgatggctccgaacaccctcgaagcgcgccactcgctt
cccCCATAGCCACCCCAGAAATGGTGAAAA

qPCR Data analysis (DAY 5)

	Ct values	
Housekeeping genes(GAPDH)	Ct 1	Ct 2
Untreated (control)	18.5	18.5
Untreated (control)	17.8	17.8
Untreated (control)	17.5	17.5
Treated	18.3	18.3
Treated	18.5	18.5
Treated	18.2	18.2

	Ct values	
Gene of interest (HER2)	Ct 1	Ct 1
Untreated(control)	23.3	22.5
Untreated(control)	22.5	22.2
Untreated(control)	21.2	21.9
Treated	25.3	25.3
Treated	26.5	26.5
Treated	27.5	27.5

The following data are results of qPCR from cancer cell lines. HER2 stands for human epidermal growth factor. It's healthy in normal amounts, but too much may be a sign of a certain type of breast cancer. Calculate the 2 Delta Ct values for the following data and plot the values on a graph using graphpad prism.

	HOUSEKEEPING GENE		**GENE OF INTEREST**		**Average Ct value for HG**	**Average Ct value for GOI**	**ΔCt value**	**ΔΔCt value**	**Fold Change**
	Ct1	Ct2	Ct1	Ct2					
control (untreated)	17.5	17.5	21.2	21.9	17.5	21.55	4.05	0	1
sample1	18.3	18.3	25.3	25.3	18.3	25.3	7	2.95	0.129408115
sample2	18.5	18.5	26.5	26.5	18.5	26.5	8	3.95	0.064704058
sample3	18.9	18.2	27.5	27.5	18.55	27.5	8.95	4.9	0.033492921