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Midterm Project

1)

control\_1\_200nM:

HighAvg = 10.0012

LowAvg = 1.9998

control\_1\_400nM:

HighAvg = 10.0009

LowAvg = 2.0007

control\_1\_600nM:

HighAvg = 9.9963

LowAvg = 2.0009

control\_2\_300nM:

HighAvg = 9.9990

LowAvg = 7.0007

control\_2\_600nM:

HighAvg = 9.9989

LowAvg = 6.9967

control\_2\_900nM:

HighAvg = 9.9999

LowAvg = 6.9992

Average open current = (10.0012+10.0009+9.9963+9.9990+9.9989+9.9999)/6 = 9.9994 pA

Average closed current of Analyte 1 = (1.9998+2.0007+2.0009)/3 = 2.0005 pA

Average closed current of Analyte 2 = (7.0007+6.9967+6.9992)/3 = 6.9989 pA

2)

<Tbound>:

control\_1\_200nM: 0.0292 s

control\_1\_400nM: 0.0285 s

control\_1\_600nM: 0.0301 s

control\_2\_300nM: 0.0336 s

control\_2\_600nM: 0.0361 s

control\_2\_900nM: 0.0335 s

Method of Averages for Koff

Koff = 1/<Tbound>

Analyte 1

Koff,1a = 1/0.0292s = 34.246 s^-1

Koff,1b = 1/0.0285s = 35.0877 s^-1

Koff,1c = 1/0.0301s = 33.2226 s^-1

Analyte 2

Koff,2a = 1/0.0336s = 29.7619 s^-1

Koff,2b = 1/0.0361s = 27.7008 s^-1

Koff,2c = 1/0.0335 = 29.8507 s^-1

Histogram for Koff

control\_1\_200nM

Koff = 33.105

Error = Koff(1.96/sqrt(500))

Koff = 33.105 +- 2.902 s^-1

control\_1\_400nM

Koff = 35.23 +- 3.088 s^-1

control\_1\_600nM

Koff = 41.3 +- 3.62 s^-1

control\_2\_300nM

Koff = 29.222 +- 2.561 s^-1

control\_2\_600nM

Koff = 25.672 s^-1 +- 2.2503 s^-1

control\_2\_900nM

Koff = 31.852 +- 2.792 s^-1

Mean Koff by method of averages

Analyte 1: (34.246 + 35.0877 + 33.2226)/3 = 34.1854 s^-1

Analyte 2: (29.7619 + 27.7008 + 29.8507)/3 = 29.1045 s^-1

Mean Koff by histogram

Analyte 1: (33.105 + 35.23 + 41.3)/3 = 36.5450 s^-1

Analyte 2: (29.222 + 25.672 + 31.852)/3 = 28.9153 s^-1

3)

<Tunbound>:

control\_1\_200nM: 0.0144 s

control\_1\_400nM: 0.0079 s

control\_1\_600nM: 0.0055 s

control\_2\_300nM: 0.0144 s

control\_2\_600nM: 0.0066 s

control\_2\_900nM: 0.0046 s

Method of Averages for Kon

Kon = 1/(<Tbound>\*concentration)

Analyte 1

Kon,1a = 1/(0.0144 s \* 200nM) = 0.3472 (s^-1)(nM^-1)

Kon,1b = 1/(0.0079 s \* 400nM) = 0.3165 (s^-1)(nM^-1)

Kon,1c = 1/(0.0055 s \* 600nM) = 0.3030 (s^-1)(nM^-1)

Analyte 2

Kon,2a = 1/(0.0144 s \* 300nM) = 0.2315 (s^-1)(nM^-1)

Kon,2b = 1/(0.0066 s \* 600nM) = 0.2525 (s^-1)(nM^-1)

Kon,2c = 1/(0.0046 s \* 900nM) = 0.2415 (s^-1)(nM^-1)

Histogram for Kon

control\_1\_200nM

Kon = -slope/concentration = 68.564/200 = 0.3428 (s^-1)(nM^-1)

Error = Kon(1.96/sqrt(500))

Kon = 0.3428 +- 0.0300 (s^-1)(nM^-1)

control\_1\_400nM

Kon = 0.3191 +- 0.0280 (s^-1)(nM^-1)

control\_1\_600nM

Kon = 0.3388 +- 0.0297 (s^-1)(nM^-1)

control\_2\_300nM

Kon = 0.2619 +- 0.0230 (s^-1)(nM^-1)

control\_2\_600nM

Kon = 0.2813 +- 0.0247 (s^-1)(nM^-1)

control\_2\_900nM

Kon = 0.2405 +- 0.0211 (s^-1)(nM^-1)

Mean Kon by method of averages

Analyte 1: (0.3472 + 0.3165 + 0.3030)/3 = 0.3222 (s^-1)(nM^-1)

Analyte 2: (0.2315 + 0.2525 + 0.2415)/3 = 0.2418 (s^-1)(nM^-1)

Mean Kon by histogram

Analyte 1: (0.3428 + 0.3191 + 0.3388)/3 = 0.3336 (s^-1)(nM^-1)

Analyte 2: (0.2619 + 0.2813 + 0.2405)/3 = 0.2612 (s^-1)(nM^-1)

4)

Analyte1:

200nM

Pbound = 0.6671

Pfree = 0.3329

400nM

Pbound = 0.7815

Pfree = 0.2185

600nM

Pbound = 0.8413

Pfree = 0.1587

Analyte2:

300nM

Pbound = 0.6992

Pfree = 0.3008

600nM

Pbound = 0.8442

Pfree = 0.1558

900nM

Pbound = 0.8760

Pfree = 0.1240

Pbound/Pfree = Kon[]/Koff

5) Mystery\_data0

Average open current = 9.9994 pA

Average closed current of Analyte 1 = 2.0005 pA

Average closed current of Analyte 2 = 6.9989 pA

Analyte1:

<Tbound> = 0.0348 s

<Tunbound> = 0.0193 s

Analyte2:

<Tbound> = 0.0341 s

<Tunbound> = 0.0109 s

Method of averages

Concentration = 1/(<Tunbound>\*Kon)

Analyte1:

1/(0.0193s\*0.3222 (s^-1)(nM^-1)) = 160 nM

Analyte2:

1/(0.0109s\*0.2418 (s^-1)(nM^-1)) = 380 nM

Histogram

Kon = -slope/concentration

Concentration = -slope/Kon = 57.639/0.3222s (s^-1)(nM^-1) = 178.9 nM

Graph

Pbound/Pfree = Kon[]/Koff

Analyte1:

Pbound = 0.6395

Pfree = 0.3605

Pbound/Pfree = 1.7739

y = 0.0082x + 0.33 (from graph)

x = (1.7739-0.33)/0.0082 = 176 nM

Analyte2:

Pbound = 0.7561

Pfree = 0.2439

Pbound/Pfree = 3.1

y = 0.0079x + 0.1958

x = (3.1-0.1958)/0.0079 = 368 nM