

March 4th, 2014

we want diff. eq's with how protein changes over time

$$\frac{d[\text{protein}]}{dt} = \underbrace{\alpha \left(\frac{\text{fraction of unbound promoter}}{\text{amount of unbound promoter}} \right) \cdot (\text{total promoter})}_{\text{shows strength of promoter}} - \underbrace{\gamma [\text{protein}]}_{\text{degradation/dilution}}$$

* at steady state, this = 0

kind of difficult to determine fraction unbound

but we know $\text{fraction bound} = (1 - \text{fraction unbound})$

$$= 1 - \frac{R^n}{R^n + K}$$

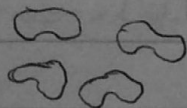
hill coefficient
hill fxn

R = concentration of molecule of interest

now we can fit our data to a hill curve

cooperativity, needs to be dimerized/tetramerized before it can work.

ex. hemoglobin



- four units need to come together to bind oxygen
- each consecutive unit wants to bind the next one even more (affinity increases)

* NOTE ~~activator~~ PROMOTER VERSUS REPRESSOR

↓
we care about bound promoter

↓
we care about unbound promoter

Intro to MATLAB

live by the cheat sheet

workspace shows variable names and current values

end of line semicolons, stop printing

clear clears ~~workspace~~ workspace

.m files = MATLAB scripts

"clear all" and "close all" to clear any lingering data
first 2 lines of all code

making an inline fxn definition

ex. `lyla @(x,y) (3*x+2+y)`

@ = it's a fxn

* up and down arrow keys

(x,y) = depends on x and y

dot commands = counterpart of reg ops but for matrices

. * = matrix multiply . + = matrix add etc...

PRO TIPS

wanna know what a fxn does?

`help nameOfFxn`

`doc nameOfFxn` → sends you to documentation

ODE45 = good diff eq. solver

debugging

we can step through the program!

→ by putting breaks in multiple lines #winning

1pm Friday = BioCompiler tutorial session

next time

CIRCUIT EQUATIONS

and put them into MATLAB