BIOM1010 – Engineering in Medicine and Biology

Tutorial – Week 3

In preparation for the tutorial in Week 3 on graphing and data presentation there are three sets of data on the following pages.

Prior to the tutorial graph each set of data and submit your graphs via Moodle.

Advice

- You want the viewer to get the message the data is presenting. Easily, without a great effort.
- The important element of the graph is the data.
- Don't clutter the graph with extraneous junk. Non-data.
- A neat graph can be prepared by hand on graph paper.

Submit each of your graphs using the Moodle submission tool. These can be in various standard file formats including pdf or a photo/scan of a hand-drawn plot.

Data set 1

Raisanen et. al. [1] measured the amount of bufotenin, a hallucinogenic serotonin derivative, in the urine of hospitalized, violent offenders who were additionally classified as either paranoid or non-paranoid. For comparison, they also measured levels in non-violent subjects (laboratory personnel).

Prepare a graph that displays these data in a clear and informative manner.

Submit your graph via Moodle.

	Bufotenin excretion (nmol / g creatinine)		
	Violent Offenders		Laboratory personnel
	Paranoid	Non-Paranoid	
	1	1	1
	2	1	1
	8	1	1
	9	1	1
	12	1	1
	14	1	1
	18	1	2
	19	2	2
	22	2	2
	27	2	1
	28	2	2
	37	3	2
	48	5	3
	61	6	3
	72	6	4
	101	7	6
		8	7
		9	8
		10	8
		11	10
		12	11
		22	13
		23	
		35	
		42	
		48	
		50	
Mean	29.938	11.556	4.091
Standard deviation	27.822	15.049	3.753
Median	20.5	6	2

Data set 2

In a study of appetite suppression, 24 rats were randomly assigned to 3 treatment groups. They received an amphetamine injection of 2 or 5 mg amphetamine per kg of body weight or else an injection of saline only. Food consumption (grams per kg of body weight) over the next 3 hours is tabulated below.

Prepare a graph that shows the relationship between amphetamine dose and food consumption. **Submit your graph via Moodle**.

Dose	0mg	2 mg	5 mg
	112.6	77.8	38.5
	102.1	89.3	81.3
	90.2	71.8	57.1
	81.5	59.8	62.3
	105.6	85.2	51.5
	93.0	94.5	48.3
	106.6	80.0	42.7
	108.3	81.6	57.9
mean	100.0	80.0	55.0
std. dev.	10.7	10.7	13.3
n	8	8	8

Note: the overall mean is 78.3 g/kg

Data set 3

The release of a model drug was observed from a hydrogel over a period of 50 minutes. The amount of model drug released was determined using a plate reader that measures the absorbance at a particular wavelength that is directly related to the amount of model drug that is present in the solution. The condition under which the model drug was released from the hydrogel was investigated with drug release assessed under stirring and non-stirring conditions. For each time point three samples were taken and their absorbance measured.

Prepare a graph that shows the relationship between the amount of model drug released over time, and compare the amount released under stirring and non-stirring conditions.

Submit your graph via Moodle.

Model drug release under stirring conditions

	Absorbance				
Time Point (min)	Sample 1	Sample 2	Sample 3	Average	S.D
0	0.030	0.032	0.033	0.032	0.002
1	0.145	0.143	0.145	0.144	0.001
5	0.157	0.153	0.150	0.153	0.004
10	0.251	0.245	0.248	0.248	0.003
20	0.323	0.320	0.324	0.322	0.002
30	0.437	0.434	0.429	0.433	0.004
40	0.542	0.550	0.541	0.544	0.005
50	0.598	0.625	0.604	0.609	0.014

Model drug release under non-stirring conditions

	Absorbance				
Time Point (min)	Sample 1	Sample 2	Sample 3	Average	S.D
0	0.030	0.030	0.031	0.030	0.001
1	0.164	0.147	0.146	0.152	0.010
5	0.185	0.188	0.187	0.187	0.002
10	0.201	0.209	0.201	0.204	0.005
20	0.344	0.339	0.344	0.342	0.003
30	0.413	0.404	0.413	0.410	0.005
40	0.455	0.473	0.452	0.460	0.011
50	0.581	0.581	0.592	0.585	0.006

References

1. Raisanen MJ, Virkkunen M, Huttunen MO, Furman B, Karkkainen J: Increased urinary excretion of bufotenin by violent offenders with paranoid symptoms and family violence. Lancet 2(8404): 700-701(1984).