BCH714: Computational Systems Biology Minicourse 2026:

The Program:

04/03 Wednesday	**05/03 Thursday**	**06/03 Friday**
09:30 Peer grading of Assessment 1 JR & DvN **14:00** Introduction to Practical DvN & KS	**09:30** Research lecture JR **11:00** Group 1 (First set of experiments) DvN	**9:00** Group 2 (First set of experiments) DvN Group 1 (Data analysis) JR **14:00** Group 1 (Second set of experiments) DvN Group 2 (Data analysis) JR
09/03 Monday	**10/03 Tuesday**	**11/03 Wednesday**
9:00 Group 2 (Second set of experiments DvN Group 1 (data analysis) JR **13:00** Data analysis / Redo experiments JR & DvN	**09:00** Data analysis / Redo experiments JR & DvN **14:00** Data analysis / Redo experiments JR & DvN	**09:00** Data analysis / Redo experiments JR & DvN **14:00** Data analysis / Redo experiments JR & DvN
12/03 Thursday	**13/03 Friday**	**16/03 Monday**
9:30 Research lecture DvN **11:00** Data analysis (whole day) JR	**09:00** Data analysis (whole day) JR	**Hand in final report (16/03/2026) at 23:59**

GROUPS:

1A
- Dillon Williams
- Louis Potgieter
- Nabeelah Ismail

1B
- Kerryn Bosch
- Kate Biebuyck

1C
- Louis Barnard
- Jordan Hobbs

1D
- Josh Richardson
- Leah Geldenhuys

2A
- Florian Rüffler
- Megan Venter

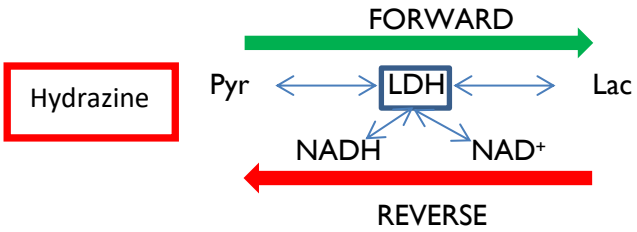
2B
- Karissa Govender
- Khumo Shungo

2C
- Nathan Haupt
- Jonathan Mills
- Anifa Mabece

2D
- Clarissa Joubert
- Olaf Vries

ABOUT THE PRAC:

(1) Characterise the enzyme:



(2) The experiments:

Experiment 1: Rate as a function of substrate

GROUP A
- Reverse direction
- Varying [NAD^+]
- Same [Lac] +[LDH] + [Hydrazine]

GROUP B
- Reverse direction
- Varying [Lac]
- Same [NAD^+] +[LDH] + [Hydrazine]

GROUP C
- Forward direction
- Varying [NADH]
- Same [Pyr] +[LDH]

GROUP D
- Forward direction
- Varying [Pyr]
- Same [NADH] +[LDH]

Experiment 2: Product Inhibition

GROUP A
- Product Inhibition: NADH
- Varying [NADH]
- Same [Lac] +[NAD^+] + [LDH] + [Hydrazine]

GROUP B
- Without Hydrazine
- Varying [Lac]
- Same [NAD^+] +[LDH]

GROUP C
- Product Inhibition: NAD^+
- Varying [NAD^+]
- Same [Pyr] +[NADH]+[LDH]

GROUP D
- Product Inhibition: Lac
- Varying [Lac]
- Same [NADH] + [Pyr]+[LDH]

(3) An enzyme assay:

a- Pipette metabolites into the cuvettes, the reaction is initiated by the addition of the enzyme, LDH

b- Once the enzyme is added, measure the absorbance readings for the reaction over a period of 3mins.

c- The types of data we expect to see- Forward reaction: decreasing Abs; Reverse reaction: increasing Abs

(4) What needs to be done:

Create a pipetting schema so that we investigate 10 different concentrations around the Km values. Take the following into consideration:

Km		Stock concentrations	
Km(NADH)	= 0.03 mM	[NADH]	= 1 mM
Km(NAD^+)	= 0.5 mM	[NAD]	= 20 mM
Km(Pyr)	= 1 mM	[Pyr]	= 20 mM
Km(Lac)	= 10 mM	[Lac]	= 500 mM

b - Volumes:

- The total cuvette volume is 1 mL.
- If you are doing reverse direction experiments (only) 100 µL of the 1 ml is Hydrazine (Stock is 25%, final concentration should be 2.5%).
- 100 µL of the total volume is LDH (Stock is 5 U/mL, final concentration in cuvette is 0.5 U/mL.
- The other volumes are of the substrate and co-factor which you calculated in the pipetting schema.
- Lastly, the remaining volume to make up this 1 mL volume is done by adding buffer to the cocktail mixture.

c - The ten substrate concentrations:

- The range you are going to investigate is between Km/10 and 10 x Km and the fixed substrates are usually at saturating conditions i.e. 10 x Km (unless instructed otherwise). Use Excel to create an incremental pipetting schema.