

*figuresection *tablesection subsectionsection
*figuresection *tablesection subsectionsection

Identification of Human Genetic Locus from Unknown Meat Sample by Restriction Fragment Length Polymorphism

Noah H. Kleinschmidt¹

¹Universität Bern

04.04.2020

ABSTRACT Catalase is an enzyme, charged with protecting cells from oxidative damage by reactive oxygen species hydrogen peroxide. It has been found in all studied aerobic organisms and neutralises reactive H_2O_2 into water and molecular oxygen. In this experiment kinetic properties of catalase obtained from potato extract were studied. To that end, oxygenic activity, associated with catalase-mediated H_2O_2 decomposition, was monitored. As expected from enzymes that follow Michaelis-Menten kinetics, both enzyme and substrate concentrations were found to positively affect catalytic activity. The pH optimum could be traced around pH 8, which is in accordance with currently published data. Hydroxylamine, an inhibitor of catalase, could be shown to likely affect catalase by a competitive mechanism. MULLIS et al. (1989).

1 Introduction

2 Introduction

3 Effect of population heterogeneity in disease dynamics

A project for Computational Epidemiology (Course: 467294-HS2021)

This project models the effect of two subgroups within a population that are either "normally" susceptible (default average person) or "highly" susceptible to a disease (perhaps due to immuno-suppression because of other medical issues). As such, "normally" susceptibles (S_n) and "highly" susceptibles (S_h) are assumed to have also different rates of recovery.

SIR Model —

Susceptible Population S

This project assumes the total population S consists of two groups as per:

where α_i are the percentages of each group within the population.

Infectious Population I

As both S_n and S_h are assumed to have different susceptibilities, they are assigned two different rates of infection: β_n and β_h , where we assume for simplicity sake that $\beta_h = k \cdot \beta_n$ for some $k > 1 \in \mathbb{R}$.

Removed Population R

Removed (recovered or deceased) cannot be infected nor infect others. Both S_n and S_h have a recovery rate that assigns them to this population. Yet, we assume that the two groups have different rates of recovery γ_n and γ_h . We again assume for simplicity sake that $\gamma_h = j \cdot \gamma_n$ for some $j < 1 \in \mathbb{R}$. The total rate at which R increases is hence $\gamma_n + \gamma_h = \gamma_n + j\gamma_n = (1+j)\gamma_n$.

Relapsation of susceptibles

In our preliminary model we assume two groups within the population, the "normal" and "highly" susceptibles. We further assume that, although they both have different rates of infection and recovery, they ultimately endure the same course of disease, going from susceptible, to infectious, and ultimately to removed. However, what

if this assumption were not true, and a small part of the population were to relapse into the susceptible population S after having endured the infectious stage?

This could be the case for immuno-suppressed individuals who did survive the disease due to medical care but were unable to fully develop their own immune response. Alternatively, normally susceptibles may have endured a more severe course of disease that weakened their immune system, thus pushing them to the highly susceptibles after having left the infectious stage.

Relapsation Rate δ

Both of the above scenarios are somewhat complex, and shall be addressed in a simplified manner by introducing a relapsation rate δ_i for both normally and highly susceptibles. δ_i allows removed people to leave R to re-enter S as part of the highly susceptibles S_h . Thereby, $\frac{dS(t)}{dt}$ will be modified to receive an additive term from R , and $\frac{dR(t)}{dt}$ will receive a corresponding subtractive term. As we assume normal and highly susceptibles will have different rates of relapsation, we will use our default assumption of $\delta_h = h \cdot \delta_n$ for some $h \in \mathbb{R}$ (no restriction to bigger or smaller 1).

Relapsation SIR System of Equations

We retain $\beta_n \equiv \beta$ and $\gamma_n \equiv \gamma$, and abbreviate $\delta_n \equiv \delta$. The implemented system of differential equations is hence:

$$\frac{dS(t)}{dt} = -\beta(\alpha_n + k(1 - \alpha_n)) \cdot S(t) \cdot I(t) + \delta(1 + h) \cdot R(t)$$

$$\frac{dI(t)}{dt} = \beta(\alpha_n + k(1 - \alpha_n)) \cdot S(t) \cdot I(t) - (1 + j)\gamma \cdot I(t)$$

$$\frac{dR(t)}{dt} = (1 + j)\gamma \cdot I(t) - \delta(1 + h) \cdot R(t)$$

Lethality versus Recovery

The model outlined so far has treated recovered and deceased as equivalent. However, considering the assumption above of some more susceptible groups that may also have a higher relapsation rate, the concept of lethality should be taken into consideration as well. Immuno-suppressed individuals may very likely have a higher risk of actually dying rather than recovering. This would impact the subtractive term of $\frac{dI(t)}{dt}$ (additive in $\frac{dR(t)}{dt}$), as only a sub-group of removed may be able to relapse, namely the ones who survived. To address this we modify the model to split the current R into two groups R' (recovered, who may relapse) and D (deceased, who may not relapse). Admittedly, this does leave the SIR model for an " $SIRD$ " model (not sure about terminology?), but seems to mimic disease dynamics better under the given assumptive parameters.

Death rate θ

To split the current R (removed) we adjust the rate of transition from I to R for the two new subgroups of R , we introduce a lethality rate θ as a percentage of people who transition to R due to death rather than recovery. θ modifies the current recovery rate γ to a new recovery rate $\gamma' = (1 - \theta)\gamma$. We again assume that highly susceptibles have a different death rate than normally susceptibles: $\theta_h = q \cdot \theta_n$ for some $q > 1 \in$.

The new transition from I to R' or D is hence:

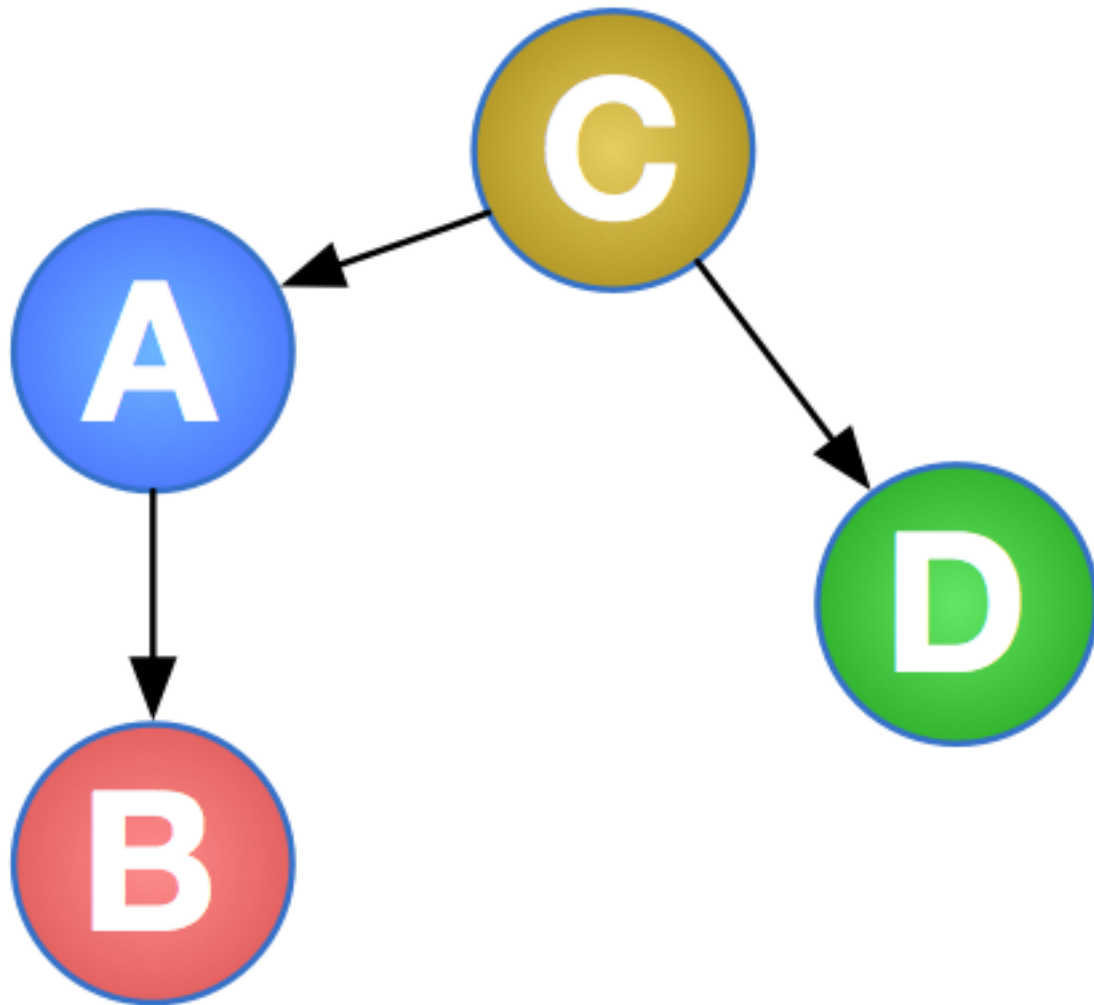


Figure 1 An example figure of an interaction mapping between arbitrary coloured dots labelled A-D.

$$\frac{dI(t)}{dt} = \beta(\alpha_n + k(1 - \alpha_n)) \cdot S(t) \cdot I(t) - (1+j)\gamma' \cdot I(t) - (1+q)\theta \cdot I(t)$$

$$dR'(t) \frac{dt}{dt = (1+j)\gamma' \cdot I(t) - \delta(1+h) \cdot R'(t)}$$

$$dD(t) \frac{dt}{dt = (1+q)\theta \cdot I(t)}$$

The final SIR(D) Model

The final implementation allows for heterogeneity within the population on infection level, recovery level, as well as relapsation level. Two groups within the population are considered, "normally susceptible" and "highly susceptible" people. Highly susceptibles are distinguished as a linearly transformed version of normal susceptibles. To model lethality impacts and relapsation rates of the different subgroups, the classical R (removed) group was split into a recovered group (R') and a deceased group D .

The final system of differential equations hence looks as follows:

$$\begin{aligned} dS(t) \frac{dt}{dt = -\beta(\alpha_n + k(1 - \alpha_n)) \cdot S(t) \cdot I(t) + \delta(1+h) \cdot R'(t) \frac{dI(t)}{dt}} &= \beta(\alpha_n + k(1 - \alpha_n)) \cdot S(t) \cdot I(t) - (1+j)\gamma' \cdot I(t) - (1+q)\theta \cdot I(t) \\ dR'(t) \frac{dt}{dt = (1+j)\gamma' \cdot I(t) - \delta(1+h) \cdot R'(t) \frac{dD(t)}{dt} = (1+q)\theta \cdot I(t)} & \end{aligned}$$

This set of differential equations now has four separate rates of transition: (1) β , the rate of infection, where highly susceptibles are distinguished by a k -fold increase. (2) γ , the rate of recovery, where highly susceptibles are distinguished by a j -fold decrease. (3) δ , the relapsation rate, where highly susceptibles are distinguished by a h -fold change compared to normally susceptibles. And (4) θ , the death rate, where highly susceptibles are distinguished by a q -fold increase compared to normally susceptibles. "

4 Methods and Experiment

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.

Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, wisi. Morbi auctor lorem non justo. Nam lacus libero, pretium at, lobortis vitae, ultricies et, tellus. Donec aliquet, tortor sed accumsan bibendum, erat ligula aliquet magna, vitae ornare odio metus a mi. Morbi ac orci et nisl hendrerit mollis. Suspendisse ut massa. Cras nec ante. Pellentesque a nulla. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Aliquam tincidunt urna. Nulla ullamcorper vestibulum turpis. Pellentesque cursus luctus mauris.

Nulla malesuada porttitor diam. Donec felis erat, congue non, volutpat at, tincidunt tristique, libero. Vivamus viverra fermentum felis. Donec nonummy pellentesque ante. Phasellus adipiscing semper elit. Proin fermentum massa ac quam. Sed diam turpis, molestie vitae, placerat a, molestie nec, leo. Maecenas lacinia. Nam ipsum ligula, eleifend at, accumsan nec, suscipit a, ipsum. Morbi blandit ligula feugiat magna. Nunc eleifend consequat lorem. Sed lacinia nulla vitae enim. Pellentesque tincidunt purus vel magna. Integer non enim. Praesent euismod nunc eu purus. Donec bibendum quam in tellus. Nullam cursus pulvinar lectus. Donec et mi. Nam vulputate metus eu enim. Vestibulum pellentesque felis eu massa.

Quisque ullamcorper placerat ipsum. Cras nibh. Morbi vel justo vitae lacus tincidunt ultrices. Lorem ipsum dolor sit amet, consectetur adipiscing elit. In hac habitasse platea dictumst. Integer tempus convallis augue. Etiam facilisis. Nunc elementum fermentum wisi. Aenean placerat. Ut imperdiet, enim sed gravida sollicitudin, felis odio placerat quam, ac pulvinar elit purus eget enim. Nunc vitae tortor. Proin tempus nibh sit amet nisl. Vivamus quis tortor vitae risus porta vehicula.

Fusce mauris. Vestibulum luctus nibh at lectus. Sed bibendum, nulla a faucibus semper, leo velit ultricies tellus, ac venenatis arcu wisi vel nisl. Vestibulum diam. Aliquam pellentesque, augue quis sagittis posuere, turpis lacus congue quam, in hendrerit risus eros eget felis. Maecenas eget erat in sapien mattis porttitor. Vestibulum porttitor. Nulla facilisi. Sed a turpis eu lacus commodo facilisis. Morbi fringilla, wisi in dignissim interdum, justo lectus sagittis dui, et vehicula libero dui cursus dui. Mauris

tempor ligula sed lacus. Duis cursus enim ut augue. Cras ac magna. Cras nulla. Nulla egestas. Curabitur a leo. Quisque egestas wisi eget nunc. Nam feugiat lacus vel est. Curabitur consectetur. Suspendisse vel felis. Ut lorem lorem, interdum eu, tincidunt sit amet, laoreet vitae, arcu. Aenean faucibus pede eu ante. Praesent enim elit, rutrum at, molestie non, nonummy vel, nisl. Ut lectus eros, malesuada sit amet, fermentum eu, sodales cursus, magna. Donec eu purus. Quisque vehicula, urna sed ultricies auctor, pede lorem egestas dui, et convallis elit erat sed nulla. Donec luctus. Curabitur et nunc. Aliquam dolor odio, commodo pretium, ultricies non, pharetra in, velit. Integer arcu est, nonummy in, fermentum faucibus, egestas vel, odio.

Sed commodo posuere pede. Mauris ut est. Ut quis purus. Sed ac odio. Sed vehicula hendrerit sem. Duis non odio. Morbi ut dui. Sed accumsan risus eget odio. In hac habitasse platea dictumst. Pellentesque non elit. Fusce sed justo eu urna porta tincidunt. Mauris felis odio, sollicitudin sed, volutpat a, ornare ac, erat. Morbi quis dolor. Donec pellentesque, erat ac sagittis semper, nunc dui lobortis purus, quis congue purus metus ultricies tellus. Proin et quam. Class aptent taciti sociosqu ad litora torquent per conubia nostra, per inceptos hymenaeos. Praesent sapien turpis, fermentum vel, eleifend faucibus, vehicula eu, lacus.

5 Results

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.

Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, wisi. Morbi auctor lorem non justo. Nam lacus libero, pretium at, lobortis vitae, ultricies et, tellus. Donec aliquet, tortor sed accumsan bibendum, erat ligula aliquet magna, vitae ornare odio metus a mi. Morbi ac orci et nisl hendrerit mollis. Suspendisse ut massa. Cras nec ante. Pellentesque a nulla. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Aliquam tincidunt urna. Nulla ullamcorper vestibulum turpis. Pellentesque cursus luctus mauris.

Nulla malesuada porttitor diam. Donec felis erat, congue non, volutpat at, tincidunt tristique, libero. Vivamus viverra fermentum felis. Donec nonummy pellentesque ante. Phasellus adipiscing semper elit. Proin fermentum massa ac quam. Sed diam turpis, molestie vitae, placerat a, molestie nec, leo. Maecenas lacinia. Nam ipsum ligula, eleifend at, accumsan nec, suscipit a, ipsum. Morbi blandit ligula feugiat magna. Nunc eleifend consequat lorem. Sed lacinia nulla vitae enim. Pellentesque tincidunt purus vel magna. Integer non enim. Praesent euismod nunc eu purus. Donec bibendum quam in tellus. Nullam cursus pulvinar lectus. Donec et mi. Nam vulputate metus eu enim. Vestibulum pellentesque felis eu massa.

Quisque ullamcorper placerat ipsum. Cras nibh. Morbi vel justo vitae lacus tincidunt ultrices. Lorem ipsum dolor sit amet, consectetur adipiscing elit. In hac habitasse platea dictumst. Integer tempus convallis augue. Etiam facilisis. Nunc elementum fermentum wisi. Aenean placerat. Ut imperdiet, enim sed gravida sollicitudin, felis odio placerat quam, ac pulvinar elit purus eget enim. Nunc vitae tortor. Proin tempus nibh sit amet nisl. Vivamus quis tortor vitae risus porta vehicula.

Fusce mauris. Vestibulum luctus nibh at lectus. Sed bibendum, nulla a faucibus semper, leo velit ultricies tellus, ac venenatis arcu wisi vel nisl. Vestibulum diam. Aliquam pellentesque, augue quis sagittis posuere, turpis lacus congue quam, in hendrerit risus eros eget felis. Maecenas eget erat in sapien mattis porttitor. Vestibulum porttitor. Nulla facilisi. Sed a turpis eu lacus commodo facilisis. Morbi fringilla, wisi in dignissim interdum, justo lectus sagittis dui, et vehicula libero dui cursus dui. Mauris tempor ligula sed lacus. Duis cursus enim ut augue. Cras ac magna. Cras nulla. Nulla egestas. Curabitur a leo. Quisque egestas wisi eget nunc. Nam feugiat lacus vel est. Curabitur consectetur.

Suspendisse vel felis. Ut lorem lorem, interdum eu, tincidunt sit amet, laoreet vitae, arcu. Aenean faucibus pede eu ante. Praesent enim elit, rutrum at, molestie non, nonummy vel, nisl. Ut lectus eros, malesuada sit amet, fermentum eu, sodales cursus, magna. Donec eu purus. Quisque vehicula, urna sed ultricies auctor, pede lorem egestas dui, et convallis elit erat sed nulla. Donec luctus. Curabitur et nunc. Aliquam dolor odio, commodo pretium, ultricies non, pharetra in, velit. Integer arcu est, nonummy in, fermentum faucibus, egestas vel, odio.

Sed commodo posuere pede. Mauris ut est. Ut quis purus. Sed ac odio. Sed vehicula hendrerit sem. Duis non odio. Morbi ut dui. Sed accumsan risus eget odio. In hac habitasse platea dictumst. Pellentesque non elit. Fusce sed justo eu urna porta tincidunt. Mauris felis odio, sollicitudin sed, volutpat a, ornare ac, erat. Morbi quis dolor. Donec pellentesque, erat ac sagittis semper, nunc dui lobortis purus, quis congue purus metus ultricies tellus. Proin et quam. Class aptent taciti sociosqu ad litora torquent per conubia nostra, per inceptos hymenaeos. Praesent sapien turpis, fermentum vel, eleifend faucibus, vehicula eu, lacus.

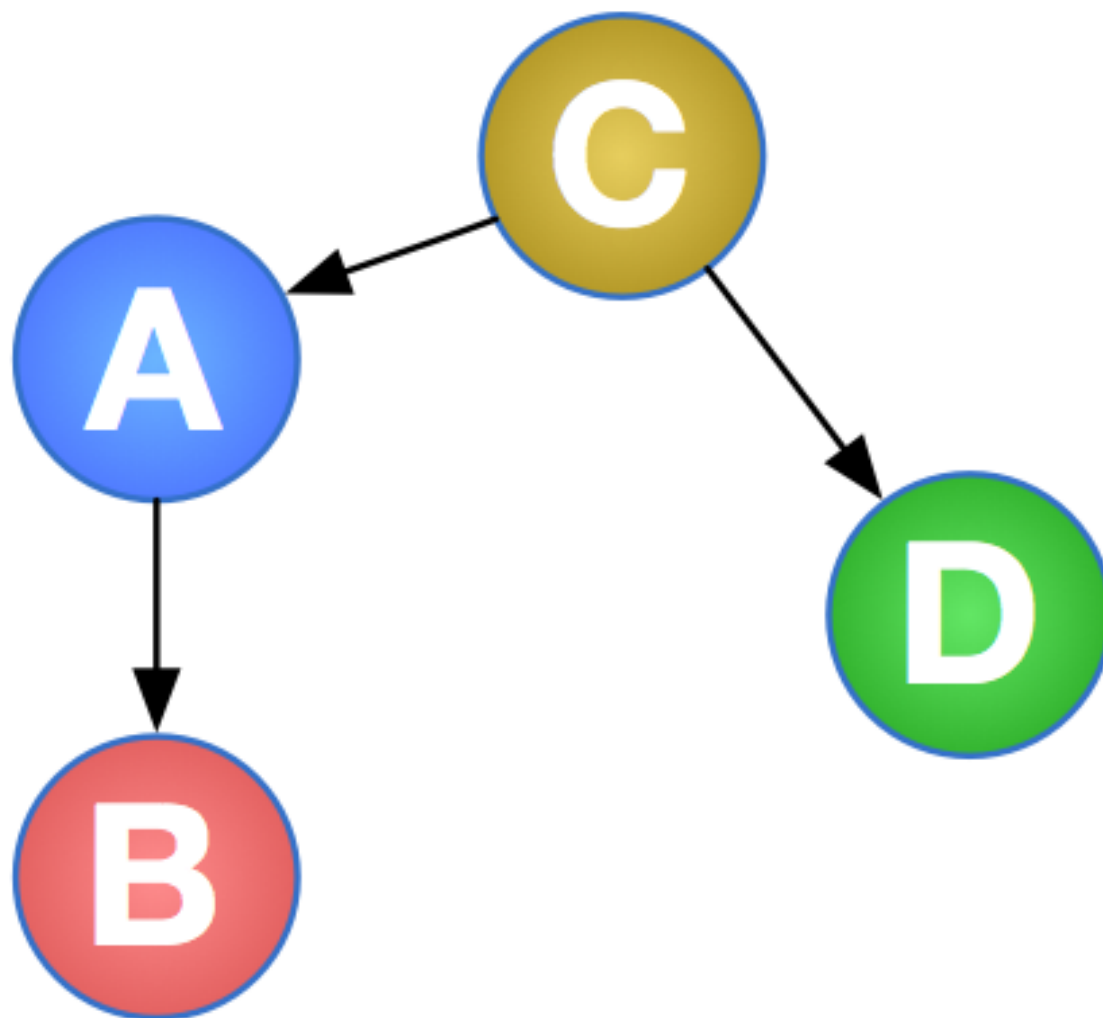


Figure 2 Melting Temperatures (T_m) of Oligomeric DNA Fragments. (left) Melting Temperature against Fragment Length, color scale indicates Cytosine/Guanine Content, a black line indicates trend behaviour. (right) Melting Temperature against Cytosine/Guanine Content, color scale indicates fragment length.

Subresults

Quisque ullamcorper placerat ipsum. Cras nibh. Morbi vel justo vitae lacus tincidunt ultrices. Lorem ipsum dolor sit amet, consectetur adipiscing elit. In hac habitasse platea dictumst. Integer tempus convallis augue. Etiam facilisis. Nunc elementum fermentum wisi. Aenean placerat. Ut imperdiet, enim sed gravida sollicitudin, felis odio placerat quam, ac pulvinar elit purus eget enim. Nunc vitae tortor. Proin tempus nibh sit amet nisl. Vivamus quis tortor vitae risus porta vehicula.

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.

Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, wisi. Morbi auctor lorem non justo. Nam lacus libero, pretium at, lobortis vitae, ultricies et, tellus. Donec aliquet, tortor sed accumsan bibendum, erat ligula aliquet magna, vitae ornare odio metus a mi. Morbi ac orci et nisl hendrerit mollis. Suspendisse ut massa. Cras nec ante. Pellentesque a nulla. Cum

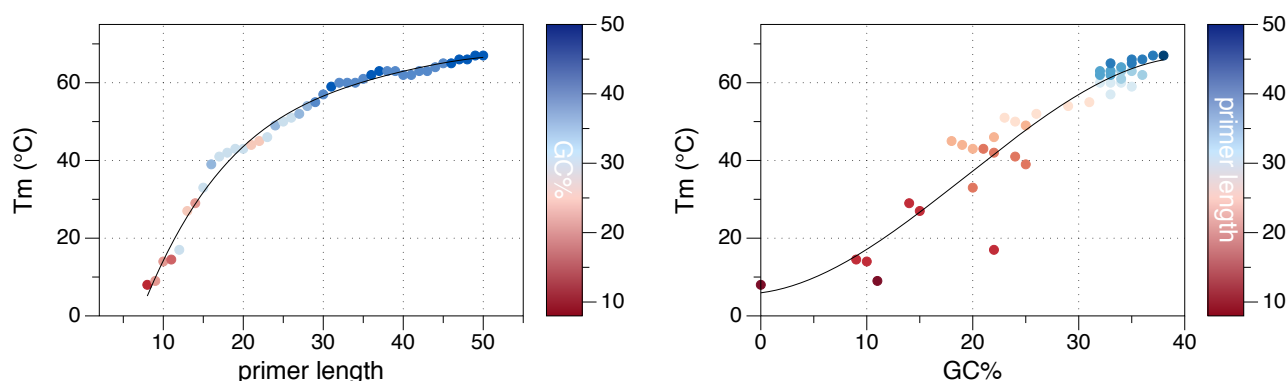


Figure 3 Melting Temperatures (T_m) of Oligomeric DNA Fragments. (upper) Melting Temperature against Fragment Length, color scale indicates Cytosine/Guanine Content, a black line indicates trend behaviour. (lower) Melting Temperature against Cytosine/Guanine Content, color scale indicates fragment length.

sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Aliquam tincidunt urna. Nulla ullamcorper vestibulum turpis. Pellentesque cursus luctus mauris.

Nulla malesuada porttitor diam. Donec felis erat, congue non, volutpat at, tincidunt tristique, libero. Vivamus viverra fermentum felis. Donec nonummy pellentesque ante. Phasellus adipiscing semper elit. Proin fermentum massa ac quam. Sed diam turpis, molestie vitae, placerat a, molestie nec, leo. Maecenas lacinia. Nam ipsum ligula, eleifend at, accumsan nec, suscipit a, ipsum. Morbi blandit ligula feugiat magna. Nunc eleifend consequat lorem. Sed lacinia nulla vitae enim. Pellentesque tincidunt purus vel magna. Integer non enim. Praesent euismod nunc eu purus. Donec bibendum quam in tellus. Nullam cursus pulvinar lectus. Donec et mi. Nam vulputate metus eu enim. Vestibulum pellentesque felis eu massa.

Quisque ullamcorper placerat ipsum. Cras nibh. Morbi vel justo vitae lacus tincidunt ultrices. Lorem ipsum dolor sit amet, consectetur adipiscing elit. In hac habitasse platea dictumst. Integer tempus convallis augue. Etiam facilisis. Nunc elementum fermentum wisi. Aenean placerat. Ut imperdiet, enim sed gravida sollicitudin, felis odio placerat quam, ac pulvinar elit purus eget enim. Nunc vitae tortor. Proin tempus nibh sit amet nisl. Vivamus quis tortor vitae risus porta vehicula.

Fusce mauris. Vestibulum luctus nibh at lectus. Sed bibendum, nulla a faucibus semper, leo velit ultricies tellus, ac venenatis arcu wisi vel nisl. Vestibulum diam. Aliquam pellentesque, augue quis sagittis posuere, turpis lacus congue quam, in hendrerit risus eros eget felis. Maecenas eget erat in sapien mattis porttitor. Vestibulum porttitor. Nulla facilisi. Sed a turpis eu lacus commodo facilisis. Morbi fringilla, wisi in dignissim interdum, justo lectus sagittis dui, et vehicula libero dui cursus dui. Mauris tempor ligula sed lacus. Duis cursus enim ut augue. Cras ac magna. Cras nulla. Nulla egestas. Curabitur a leo. Quisque egestas wisi eget nunc. Nam feugiat lacus vel est. Curabitur consectetur.

Suspendisse vel felis. Ut lorem lorem, interdum eu, tincidunt sit amet, laoreet vitae, arcu. Aenean faucibus pede eu ante. Praesent enim elit, rutrum at, molestie non, nonummy vel, nisl. Ut lectus eros, malesuada sit amet, fermentum eu, sodales cursus, magna. Donec eu purus. Quisque vehicula, urna sed ultricies auctor, pede lorem egestas dui, et convallis elit erat sed nulla. Donec luctus. Curabitur et nunc. Aliquam dolor odio, commodo pretium, ultricies non, pharetra in, velit. Integer arcu est, nonummy in, fermentum faucibus, egestas vel, odio.

Sed commodo posuere pede. Mauris ut est. Ut quis purus. Sed ac odio. Sed vehicula hendrerit sem. Duis non odio. Morbi ut dui. Sed accumsan risus eget odio. In hac habitasse platea dictumst. Pellentesque non elit. Fusce sed justo eu urna porta tincidunt. Mauris felis odio, sollicitudin sed, volutpat a, ornare ac, erat. Morbi quis dolor. Donec pellentesque, erat ac sagittis semper, nunc dui lobortis purus, quis congue purus metus ultricies tellus. Proin et quam. Class aptent taciti sociosqu ad litora torquent per conubia nostra, per inceptos hymenaeos. Praesent sapien turpis, fermentum vel, eleifend faucibus, vehicula eu, lacus.

6 Discussion

Morbi luctus, wisi viverra faucibus pretium, nibh est placerat odio, nec commodo wisi enim eget quam. Quisque libero justo, consectetur a, feugiat vitae, porttitor eu, libero. Suspendisse sed mauris vitae elit sollicitudin malesuada. Maecenas ultricies eros sit amet ante. Ut venenatis velit. Maecenas sed mi eget dui varius euismod. Phasellus aliquet volutpat odio. Vestibulum ante ipsum primis in faucibus orci luctus et ultrices posuere cubilia Curae; Pellentesque sit amet pede ac sem eleifend consectetur. Nullam elementum, urna vel imperdiet sodales, elit ipsum pharetra ligula, ac pretium ante justo a nulla. Curabitur tristique arcu eu metus. Vestibulum lectus. Proin mauris. Proin eu nunc eu urna hendrerit faucibus. Aliquam auctor, pede consequat laoreet varius, eros tellus scelerisque quam, pellentesque hendrerit ipsum dolor sed augue. Nulla nec lacus.

Table 3 HEPES 0.5M, pH7.4 | 500ml

Component	Instruction
HEPES	59.58g
MilliQ	fill-up to 450ml
NaOH 5M	to pH7.4 (~17.5ml)
MilliQ	fill-up to 500ml
Sterile Filter	

8 Supplementary Data

Table 1 1.5x LDS | 2ml

Component	Instruction
4x LDS	750ul
MilliQ	1.25ml

Table 2 BSA TBS-Tween | 50ml

Component	Instruction
BSA	2.5g
TBS-Tween	fill-up to 50ml
Before AB add 10% Na-Azide	1:1000