What is PhD?

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My story

- ***Name:*** Kasun Buddika
- ***School:*** Sumana Central College, Thalawakelle
- ***Undergraduate studies:*** Biochemistry and Molecular Biology, University of Colombo
- ***Graduate studies:*** Genome, Cell and Developmental Biology, Indiana University, Bloomington, Indiana, USA
- ***Current position:*** Scientist, Genomics at Advanced Cell Diagnostics/Bio-Techne, Newark, CA, USA

Expertise and achievements

Expertise

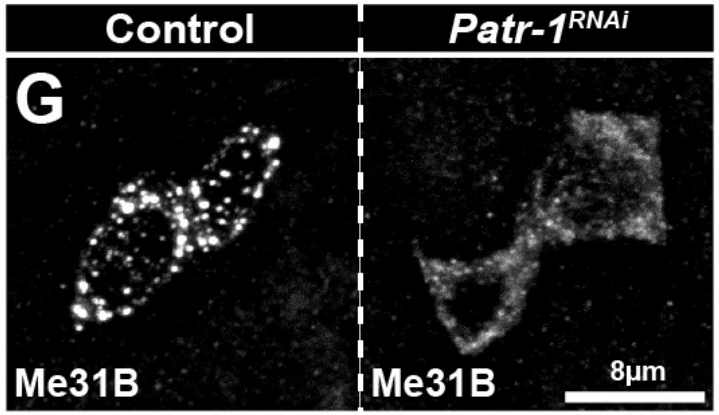
- Bioinformatics, RNA biology, stem cell biology, single cell biology, Drosophila genetics, Microscopy

Achievements

- Two scientific communications as an undergraduate researcher at UOC
- Authored 11 papers (7 already published, 1 accepted, and 3 in preparation)
- Recipient of multiple fellowships at Indiana University, Bloomington
- Have trained over 15 undergraduate students at Indiana University, Bloomington (10 of them included in papers as co-authors)
- Self-taught Bioinformatics Scientist

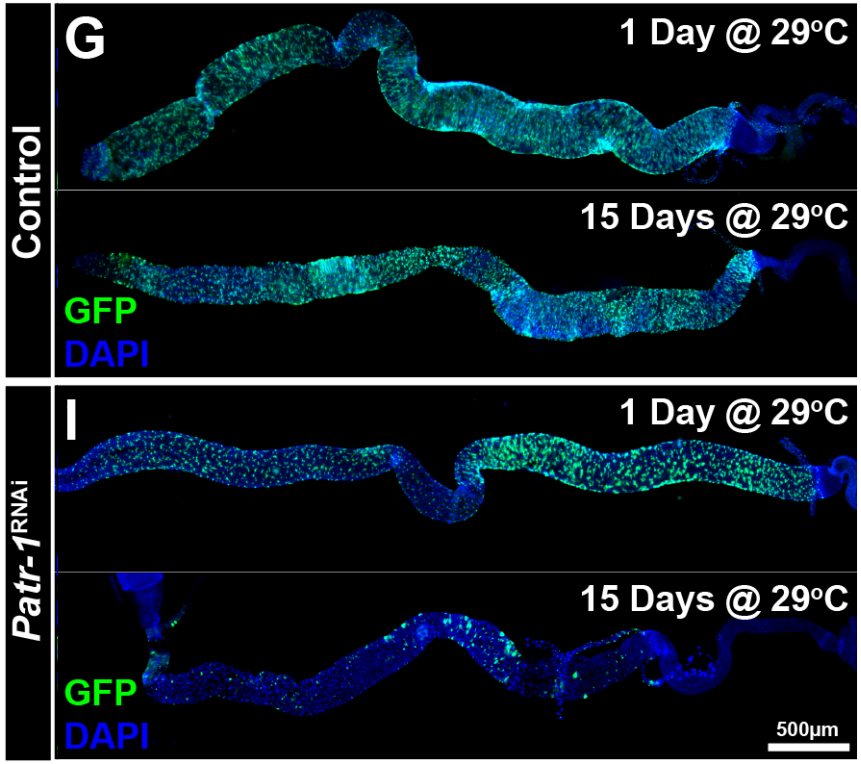
Research background

- ***Undergraduate:*** Determined antibacterial and antioxidant properties of extracts prepared from the endemic plant *Oldenlandia umbellate* using various biological and/or colorimetric assays
- ***Graduate:*** The role of messenger ribonucleoprotein complexes (mRNPs) in intestinal stem cell maintenance and differentiation

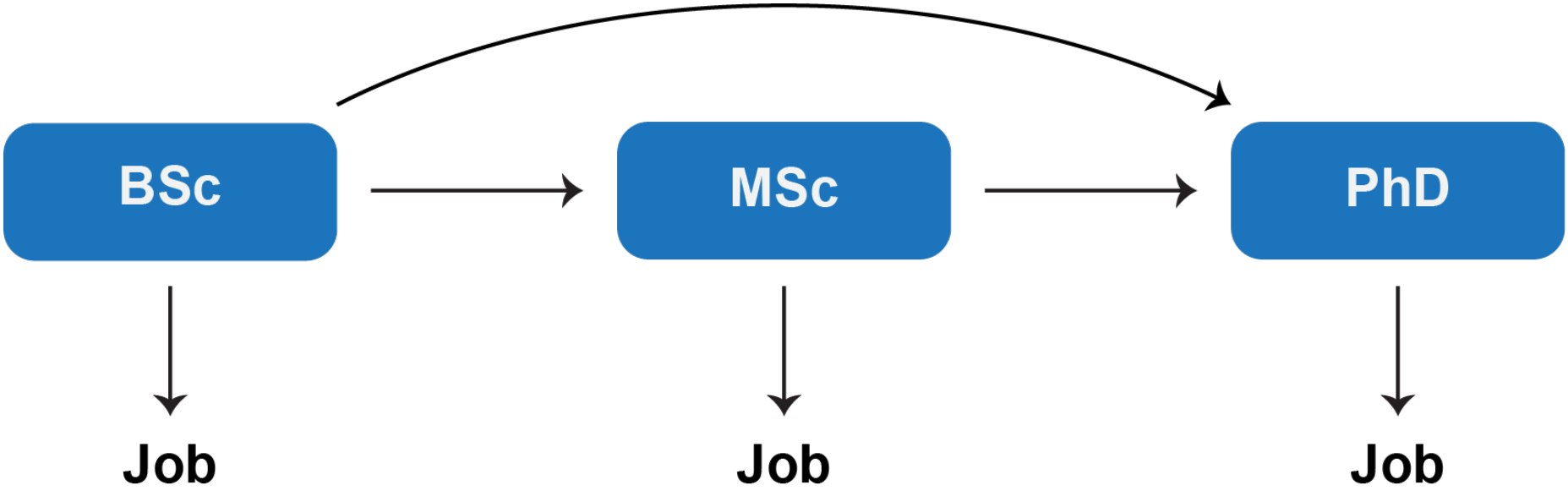


Drosophila intestinal stem cells (ISCs) contain Processing bodies (P-bodies).

ISCs precociously differentiate in the absence of mature P-bodies



What's next after you complete the BSc?



Quick facts: PhD

- **What?** PhD or Doctor of Philosophy is the most common degree at the highest academic level awarded following a course of study
- **Where?** USA, Europe, Australia, New Zealand, Korea, Japan, India and in Sri Lanka
- **Subject?** Any subject (definitely in biological sciences)
- **Duration?** On average 3 to about 7 years depending on where
- **Money?** You get paid, enough for survival

Stages of a PhD student

A student transition through several stages:

- Thinking about doing a PhD, apply and accept an offer
- Choosing research area, topic, and advisor
- Taking some classes
- Doing research and **publish papers**
- Writing the thesis and defend
- Getting a job (*i.e.,* post-doc or in industry)

Fun facts: Stages of a PhD student

Stage I

Student: “I know everything”

Advisor: Smiles

Stage II

Student: “I know nothing”

Advisor: “Let’s talk!”

Stage III

Advisor: “Let’s do X?”

Student: “No, you are wrong because Y and Z!”

Is PhD for you?

- Prerequisite to a **research** career (definitely for academia, not so much for industry)
- How do you know if research/PhD is for you?
  - Have inquisitive mind and critical thinking
  - Like to understand how things work
  - Like to identify problems and come up with solutions
  - Did some research during undergraduate studies and liked it
  - **Philosophical reasons:** Dream of changing the world!!!

Bad reasons for pursuing a PhD

- Ego
- No other job opportunities (*i.e.,* Start a PhD because you couldn't find a suitable job)
- Money (*i.e.,* Care more about the amount of money you earn opposed to what you do)
- Impress parents/girlfriend/boyfriend/family
- Afraid of the real world
- Immigrate to a different country?

What is needed to pursue a PhD

- Passion + Self-motivation
  - In a way this is a life changing decision and it is normal to have doubts sometimes
- Perseverance + Self-Confidence
  - It is heartbreaking to work hard for 4-5 years and get your paper rejected
- Independence + Leadership
  - It is your PhD
  - You need to know how to navigate through
- Focus + multitasking
- Intelligence
  - You never know how smart you are until somebody challenges you

BSc vs PhD

- Taking classes is not the priority
  - Your goal no longer is to get A+ for a class you take or have the highest GPA of the class
  - 4.0 GPA + 0 papers = Useless
- Spend most of your time on doing research and reading papers
  - Goal is to be smart and productive, not necessarily hard working
  - Hard working + 0 papers = Useless
  - **Priority:** Be productive and publish as much as possible papers
- Financially independent and enjoy life
  - PhD was the best time of my life!

Pros and cons of doing a PhD

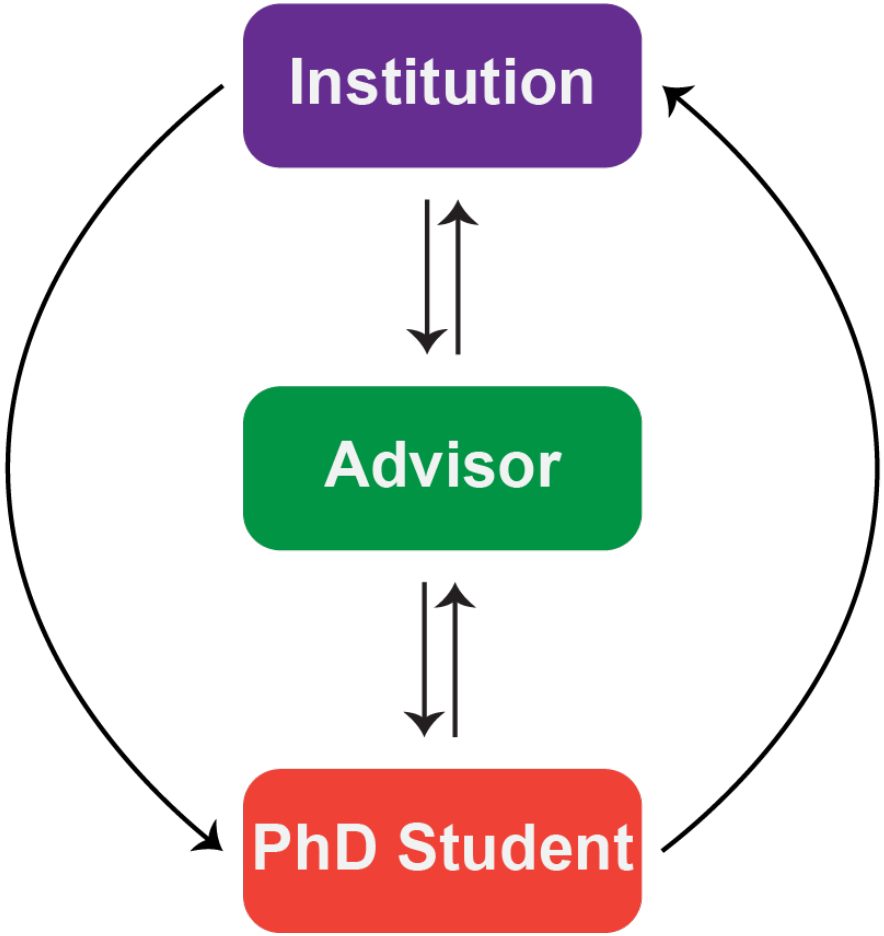
Pros

- Contribute new knowledge to the world
- Access to more prestigious jobs
- Analytical and soft skills will skyrocket
- Flexibility (it is the understanding between you and your advisor)
- Having Dr as the title (somewhat superficial, but people do care)

Cons

- Doesn’t guarantee a job
- Employers think of you as overqualified and inexperienced
- A lonely experience (away from loved ones for most parts)
- Extreme stress and frustration

PhD student, advisor and the institution



Institution expectations: Based on USA

- Find a thesis advisor, choose research topic and perform research
- Form a thesis committee
  - Committee monitors your progress and makes sure you are on track
- Take qualifying exams and pass in a timely manner
  - This proves that you are good enough to continue in the program
  - Thesis committee makes the decision
- Take a number of courses and maintain a decent GPA (*e.g.,* 3.0+) throughout years
- Perform teaching duties if getting paid as a TA
- Write dissertation and defend it
- Graduate within a fixed time window (stay longer if the advisor supports)

Advisor expectations: Based on USA

- Every PhD student must have a thesis/research advisor (exceptions?)
- Advisor decides when student is ready to graduate
  - Thesis committee makes sure advisor's decision is correct and gives feedback to improve work
- Each advisor has own requirements, but generally:
  - Have adequate background in your research area
  - Work on one or multiple projects and publish the results in several good conference/journal papers
  - Be able to clearly present your ideas and results
  - Write a good thesis
- Your papers and thesis must include your novel ideas
  - More accurately your and your advisor's ideas

PhD timeline: Based on USA institutions

Year 1 (2015-2016)

- Complete lab rotations (do research in 3-4 labs for a fixed time)
  - You choose which labs based on your interest
- Select the thesis lab/advisor at the end of all rotations
  - You make the final decision based on several factors including scientific merit, but more importantly social aspects
- Begin thesis project(s) and search for that result!
- Take a fixed number of classes
  - Definitely not like undergraduate classes
- Form a thesis committee and have the first committee meeting towards the end of the first year
- Other duties: If funding comes from TAship (teaching and grading)

PhD timeline: Based on USA institutions

Year 2 (2016-2017)

- Continue research work (*i.e.,* find that one positive result among many negative results)
- Take a fixed number of classes
  - Never spend time unnecessarily on these
- Getting ready for the qualifying exam
- Literature review (in some institutions)
- Read papers and get familiarized yourself with the research question(s)
- Other duties: If funding comes from TAship (teaching and grading)

PhD timeline: Based on USA institutions

Year 3 (2017-2018)

- Take the qualifying exam (at the beginning of the academic year)
- Re-take it if you fail the first time
  - Believe me, this happens more often than you think
  - If you fail, you have the option to leave the program with a masters.
- Continue research work (*i.e.,* likely you have a lead by now and more focused)
- Take a fixed number of classes (if necessary)
- Read more papers and get familiarized yourself with the research question(s)
- Other duties: If funding comes from TAship (teaching and grading)

PhD timeline: Based on USA institutions

Year 4+ (2018+)

- Continue research work (*i.e.,* extremely focused and multitasking)
- Read more papers and get familiarized yourself with the research question(s)
- **Write papers and present your work at conferences** (most important, can start early too)
- Write the thesis and defend
- Other duties: If funding comes from TAship (teaching and grading)

Important decisions to make

- Thesis advisor and the research area (most important)
  - Think about current and future trends
- University or the institution at which you will pursue the PhD
  - Number of labs fitting your research interest
  - Rank of the university
- Country or the region (USA vs Europe? Indiana vs California?)
  - Cost of living vs the stipend
- RA vs TA
  - Not important (my personal view), but students do think about this

Don’t forget

- That PhD requires smart work, not hard work!
- To take rest when needed
- To find a hobby (*i.e.,* travel and explore the world)
- To talk to your loved ones far away from you

- More importantly to **enjoy life**! That was the best time of my life.

Thank You!

Stay connected

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