

1. General Course Information (mandatory)

Course: BIOL505

Course title: Cell Signaling in Development and Disease

Pre-requisites: Level 4 and registration in a Biology Honours Plan (BIOL-M-BSH, BIOL-P-BSH, BIMA-P-BSH, BIPS-P-BSH, BTEC-P-BSH, EBIO-P-BSH) and (a minimum GPA of 2.0 in the Biological Foundations List) and BIOL 330/3.0 or permission of Department.

Semester and year: Winter 2026

Number of credits: 3.0

Learning hours: 120

Modality (on campus, blended, or online): blended

Teaching Assistants (if applicable): **N/A**

Contact Information: (if applicable)

Office Hours & Location: (if applicable)

2. Course Description (mandatory)

The course is called Cell signaling in Development and Disease but it will cover any topics in Cell and Molecular Biology. Subjects will be chosen based on students' interests. Since the instructor (Dr. Chin-Sang) has interest in developmental biology there will be emphasis but not limited to developmental biology. The aim of developmental biology is to understand how plants and animals are formed from a single cell. This involves cell divisions, cell differentiation, pattern formations, cell shape changes, and cell movements. All of these processes are beautifully orchestrated to form the functional tissues, patterns, and structures of all organisms. Traditionally, these processes of development have been mainly descriptive from experimental embryology approaches. This course will focus on the genetic and molecular analyses of how these cell behaviors occur. We will explore the approaches developmental biologists use to try and decipher the language of how cells communicate with each other during development and how this information is used to understand and treat disease states. The molecular principles that govern development have been conserved throughout animal evolution and these discoveries have brought about a new wave of excitement in the way which we can describe developmental mechanisms. Students will explore how developmental biology plays a role in medical fields such as stem cell therapy, tissue engineering and regenerative medicine.

3. Calendar course description: This seminar-based course investigates the genetic and molecular underpinnings of cell signaling in developmental biology and disease, with a focus on how single cells coordinate behaviours such as cell division, cell differentiation, pattern formation and cell shape changes and movements. Students will engage in three core components: (1) critical analysis of primary research articles through weekly discussions, (2) a writing assignment involving a concise mini-review of a recent peer-reviewed study, and (3) a student-led seminar presentation exploring topics such as signaling pathways in embryogenesis, or dysregulated mechanisms in cancer/metabolic disorders. Content is tailored to class interests, allowing flexibility to delve into cutting-edge themes at the intersection of cell biology, genetics, and pathology. Lecture notes, curated scientific literature, and online resources replace a traditional textbook. Designed for students in molecular cell biology or related fields, the course prioritizes scientific rigor, communication skills, and connecting mechanistic insights to broader developmental and disease contexts.

4. Topics

Week	Module	Topic
1	Introduction	Introduction and Expectations
2	Introduction/Student Biography	Student's interests and goals
3	Introduction to deconstruction of research articles and seminar presentations / Article selection	Using deconstruction techniques in education, work on "News & Views" review
4	News and Views presentations	Current research articles
5	News and Views presentations	Current research articles
6	independent study/class discussions	Seminar presentations
7	independent study/class discussions	Seminar presentations
8	Blended Learning/ Independent study	Seminar presentations
9	Blended Learning/ Independent study	Seminar presentations
10	Blended Learning/ Independent study	Seminar presentations
11	Article deconstruction	Research deconstruction of selected articles
12	Article deconstruction	Research deconstruction of selected articles

5. Course Learning Outcomes (mandatory)

Use CLOs approved by Faculty Board and available in the academic calendar:

<https://www.queensu.ca/academic-calendar/arts-science/course-descriptions/>

On successful completion of this course, students will be able to:

1. Describe how biochemistry, genetics and molecular biology are used to elucidate both the normal function of cells and what goes wrong in disease states.
2. Explain how the control of gene regulation contributes to development.
3. Describe how model organism help us understand development, and the strengths and weaknesses of each.
4. Review, critique and interpret research articles from scientific journals.
5. Present and understand research data in specialized fields of molecular and cell biology.

6. Important University Dates

Please visit the [Faculty of Arts and Sciences Sessional Dates website](#) for all academic deadlines.

Inclusion

7. Land Acknowledgement

Let us acknowledge that Queen's University occupies traditional Anishinaabe and Haudenosaunee territory. To acknowledge this traditional territory is to recognize its longer history, one predating the establishment of the earliest European colonies. It is also to acknowledge this territory's significance for the Indigenous Peoples who lived, and continue to live, upon it and whose practices and spiritualities are tied to the land and continue to develop in relationship to the territory and its other inhabitants today. Indigenous communities in Kingston/Katarokwi continue to reflect the area's Anishinaabe and Haudenosaunee roots. There is also a significant Métis community and First Peoples from other Nations across Turtle Island present here today. To read more about the history of the land, see the [Queen's Encyclopedia](#) and to learn more about land acknowledgements, see the [Office of Indigenous Initiatives](#).

8. Equity, Diversity, and Inclusivity Statement

Queen's University recognizes that the values of equity and diversity are vital to and in harmony with its educational mission and standards of excellence. It acknowledges that direct, indirect, and systemic discrimination exists within our institutional structures, policies, and practices and in our community. These take many forms and work to differentially advantage and disadvantage persons across social identities such as race, ethnicity, disability, gender identity, sexual orientation, faith, and socioeconomic status, among other examples. In this class I will create an inclusive environment where all students feel valued and supported. Every member of this class is asked to show respect for every other member.

9. Building a Classroom Community

University is a place to share, question, and challenge ideas. Each student brings a different set of lived experiences. You can help to create a safer, more respectful classroom community for learners by following these guidelines:

- Make a personal commitment to learn about, understand, and support your peers.
- Assume the best of others and expect the best of them.
- Recognize and value the experiences, abilities, and knowledge each person brings to the course.
- Acknowledge the impact of oppression on other people's lives and make sure your words and tone are respectful and inclusive.
- Encourage others to develop and share their ideas.
- Pay close attention to what your peers say/write before you respond. Think through and re-read what you have written before you post online or send your comments to others.
- Be open to having your ideas challenged and challenge others with the intent of facilitating growth.
- Look for opportunities to agree with one another, building on and intentionally referencing peers' thoughts and ideas; disagree with ideas without making personal attacks, demeaning, or embarrassing others.

10. Fostering Accessibility

All of us have a shared responsibility for reducing barriers to learning and fostering accessibility and promoting meaningful inclusion of those with disabilities. The [Accessibility Hub](#) at Queen's University's Human Rights & Equity Office offer a host of [tutorials](#) that provide us all with practical tips for:

- creating accessible documents, e.g., to submit to your teaching team or share with peers in peer feedback activities/in a presentation,

- emails, e.g., while communicating with group members or your teaching team, and
- meeting practices (e.g., in tutorials/labs/seminars or virtual meetings).

11. Name/Pronoun

If, for whatever reason, you wish to change how your name appears in onQ and/or on class lists, please follow these steps. You may also use this process to add your pronouns to the appearance of your name.

1. Log into SOLUS.
2. Click on Personal Information tab.
3. Click on the Names tab
4. Click on the Add New Name tab
5. Choose Preferred from the Name Type drop down menu
6. Enter the name you would like to appear in onQ and/or on class lists.
7. Click Save.

Please allow 24 to 48 hours for your name to be registered within the system. If you have further questions or concerns, please contact ITS at Queen's University.

Course Materials & Technologies

* Material costs Mandatory

There is no course textbook as we will use current articles from the primary literature.

Cost of learning material: Free for Queen's students

• Recommended Course Textbooks

Review your textbooks that you have used in previous courses

12. Required Course Textbooks **N/A**

Course Textbooks	Edition(s)	Publisher	For Purchase	Cost	At Queen's Library?
------------------	------------	-----------	--------------	------	---------------------

13. Other Required Materials or technologies

Resource	Resource Type	Access	Cost	Further Information
PubMed	Website	online	https://pubmed.ncbi.nlm.nih.gov	Add details.

14. Supplemental Materials **N/A**

Resource	Resource Type	Access	Cost	Further Information
----------	---------------	--------	------	---------------------

15. Educational Technologies, Help, Privacy, and Accessibility

This course makes use of the following website(s), program(s), and/or application(s) for specific educational use/purposes.

Privacy: Be aware that your independent use of the website(s), programs, and/or application(s) used in this course, *beyond what is required*, is subject to their terms of use and privacy policy. You are encouraged to review the applicable privacy statements before using the site. Please see below.

Accessibility: Queen's University is committed to developing courses that are accessible. For further information on accessibility compliance of the website(s), program(s) application(s) used in the course, please consult the links below.

Queen's Human Rights & Equity Office's [Accessibility Hub](#).

16. Notice of Recording (Mandatory for online and if relevant blended courses)

Synchronous (live) classes will be delivered in this course through Zoom and/or Teams, video conferencing platforms supported by the University. Steps have been taken by the University to configure these platforms in a secure manner. Classes will be recorded with video and audio (and, in some cases, transcription) and will be made available to students in the course for the duration of the term. The recordings may capture your name, image or voice through the video and audio recordings. By attending these live classes, you are consenting to the collection of this information for the purposes of administering the class and associated coursework. If you are concerned about the collection of your name and other personal information in the class, please contact the course instructor to identify possible alternatives.

To learn more about how your personal information is collected, used and disclosed by Queen's University, please see the [Notice of Collection, Use and Disclosure of Personal Information](#).

17. Copyright of Course Material

Course materials created by the course instructor, including all slides, presentations, handouts, tests, exams, and other similar course materials, are the intellectual property of the instructor. It is a departure from academic integrity to distribute, publicly post, sell or otherwise disseminate an instructor's course materials or to provide an instructor's course materials to anyone else for distribution, posting, sale or other means of dissemination, without the instructor's express consent. A student who engages in such conduct may be subject to penalty

for a departure from academic integrity and may also face adverse legal consequences for infringement of intellectual property rights.

Communication

18. Questions about the Course and Contacting the Teaching Team

Contact addresses for the Teaching Team will be posted on the onQ course website

19. Queen's Email

The university communicates with students via Queen's email. Please check your email regularly to ensure you do not miss important information related to your course.

20. Course Feedback

At various points during the course, you may be asked to take part in a variety of feedback activities, such as surveys and questionnaires. This feedback enables the teaching team to improve the course. All surveys are anonymous and are directly related to activities, assessments, and other course material.

Assessments

21. Weighting and Alignment with Course Learning Outcomes (CLOs) (Mandatory)

Assessment	Alignment with CLOs	Weighting
News and Views Review	Course Learning Outcomes #1-5	35%
Seminar Presentations	Course Learning Outcomes #1-5	40%
Participation/Critiques	Course Learning Outcomes #1-5	25%

Total 100%

22. Assessment Flexibility

N/A

23. Descriptions of Learning Activities and Assessments including due dates, and if assessment is not handed in class, time. Syllabus can include short descriptions of assessment, as long as full descriptions are made available on OnQ (Mandatory)

Assessment 1

Assignments: 35% This mark is based on your uploaded assignments. Assignments such as the "News and Views" type article will be on the onQ site course website.

Assessment 2

Seminars: 40% This mark is based on the research article you present. You will be graded by your fellow peers. You will be marked on your actual presentation and the seminar notes (slides) you provide to the class.

Assessment 3

Participation/critiques: 25%-- You need to come to class to get full marks. You need to ask questions and fill out critiques of presenters.

24. Proctored Exams

N/A

25. Assignment Submission Policy

*5% shall be deducted from an assignment for each day, if it is late (including weekends). **The absolute last day to submit a late assignment in this course is 2 weeks after the last day of the course.** Anything that arrives after this will not be accepted without permission of the instructor. Students with letters of accommodation should, if possible, confirm the implementation of their accommodations prior to the listed due date. Please see the "Accommodations for Disabilities" section of this syllabus for more information.*

Students experiencing short-term extenuating circumstances that are beyond their control and may affect their academic work should submit a request to their faculty office for academic consideration. Please see the "Academic Considerations for Students in Extenuating Circumstances" section of this syllabus for more details

26. Policy Review of Graded Work

Requests for assignment regrading may be made to your Instructor 48 hours after you have received the marked copy of your assignment, but no more than 10 days later. Be sure to read Instructor's feedback carefully before you submit a review of graded work. To request that your assignment be reviewed, please include the following in your email:

- *Your name, student number*
- *The original copy of your marked assignment, attached.*
- *Your reason for the request:*
 - *The specific aspects of your assignment that you believe were not sufficiently awarded, referring to the categories of the rubric.*
 - *Why you believe that your assignment meets the criteria for a higher mark for each of the categories of the rubric that you indicated above. Please make explicit reference to the detailed descriptions of each category provided in the rubric.*

If a review of graded work results in only a slightly different final grade, the original grade will stand. Should we find an error where marks were not assigned when they should have been or were missed in adding up the total score or were added up incorrectly resulting in a higher score than earned, the grade will be changed so that it is accurate. Grades would only increase or decrease if there was evidence of an error in marking, not simply because the regrader interprets or applies the rubric slightly differently than the original grader.

Policies

27. Class Attendance

Your presence and participation in class contributes to the knowledge and skills that you will develop throughout this course. I expect that you attend class regularly, participate in class conversations and learning activities. These types of activities provide active engagement, promote a deeper understanding of the course content, and contribute to your success in this course.

28. Academic Support

All undergraduate students face new learning and writing challenges as they progress through university: essays and reports become more complex; effectively incorporating research into writing becomes more important; the types of assignments become more diverse; managing your time and developing the skills you need to read and think critically gets more challenging. I encourage students to contact Student Academic Success Services (SASS). SASS offers many different ways to receive support:

- Free online or in-person [appointments](#) to get personalized support on writing and academic skills from expert staff and trained peers.
- [Workshops](#) and [drop-in programs](#). SASS' [Events Calendar lists events coming soon](#).
- [Online resources](#) that provide strategies for academic skills and writing development at university.
- If English is not your first language, SASS has specific resources for [English as Additional Language students](#), including weekly programs and EAL academic skills appointments. You can meet on an ongoing basis with an EAL consultant to work on your academic writing, speaking, listening, and reading skills.

29. Accommodations for Disabilities

Queen's University is committed to working with students with disabilities to remove barriers to their academic goals. Queen's Student Accessibility Services (QSAS), students with disabilities, instructors, and faculty staff work together to provide and implement academic accommodations designed to allow students with disabilities equitable access to all course material (including in-class as well as exams). If you are a student currently experiencing barriers to your academics due to disability related reasons, and you would like to understand whether academic accommodations could support the removal of those barriers, please visit the [QSAS website](#) to learn more about academic accommodations or start the registration process with QSAS by clicking **Access Ventus** button at [Ventus | Accessibility Services | Queen's \(queensu.ca\)](#)

VENTUS is an online portal that connects students, instructors, Queen's Student Accessibility Services, the Exam's Office and other support services in the process to request, assess, and implement academic accommodations.

To learn more go to: <https://www.queensu.ca/ventus-support/students/visual-guide-ventus-students>

Academic Consideration for Students in Extenuating Circumstances

Academic Consideration is a process for the University community to provide a compassionate response to assist students experiencing unforeseen, short-term extenuating circumstances that may impact or impede a student's ability to complete their academics. This may include but is not limited to any extenuating circumstance (illness, bereavement, traumatic event, injury, family emergency, etc.) which is short-lived, begins within the term, and will not last longer than 12 weeks - see [Academic Consideration](https://www.queensu.ca/artsci/undergraduate/student-services/academic-consideration) webpage for details (<https://www.queensu.ca/artsci/undergraduate/student-services/academic-consideration>)

Each Faculty has developed a protocol to provide a consistent and equitable approach in dealing with requests for academic consideration for students facing extenuating circumstances. For more information, undergraduate students in the Faculty of Arts and Sciences should consult the Faculty's webpage on [Academic Consideration in Extenuating Circumstances](#) and submit a request via the [Academic Consideration Request Portal](#). Students in other Faculties and Schools who are enrolled in this course should refer to the protocol for their home Faculty.

Students are encouraged to submit requests as soon as the need becomes apparent and to contact their instructor and/or course coordinator as soon as possible once academic consideration has been granted. Any delay in contact may limit the options available for academic consideration. While we encourage instructors to accommodate, each instructor has discretion in deciding whether or how to apply the Academic Consideration. For more information on the Academic Consideration process, what is and is not an extenuating circumstance, and to submit an Academic Consideration request, please see the Faculty of Arts and Science's [Academic Consideration website](#). ASO courses include links to information on **Academic Consideration** on your **Course Homepage** in onQ.

Please see the Teaching Team page for contact information for your instructor and TA(s), where relevant.

For more information, please see the [Senate Policy on Academic Consideration for Students in Extenuating Circumstances](#).

Queen's Policy Statement on Academic Integrity -Mandatory

Queen's University is dedicated to creating a scholarly community free to explore a range of ideas, to build and advance knowledge and to share the ideas and knowledge that emerge from

a range of intellectual pursuits. Each core value of academic integrity, as defined in the [Senate Academic Integrity Policy](#), gives rise to and supports the next.

Honesty appears in presenting one's own academic work, whether in the context of an examination, written assignment, laboratory or seminar presentation. It is in researching one's own work for course assignments, acknowledging dependence on the ideas or words of another and in distinguishing one's own ideas and thoughts from other sources. It is also present in faithfully reporting laboratory results even when they do not conform to an original hypothesis. Further, honesty is present in truthfully communicating in written and/or oral exchanges with instructors, peers and other individuals (e.g. teaching assistants, proctors, university staff and/or university administrators).

Trust exists in an environment in which one's own ideas can be expressed without fear of ridicule or fear that someone else will take credit for them.

Fairness appears in the proper and full acknowledgement of the contributions of collaborators in group projects and in the full participation of partners in collaborative projects.

Respect, in a general sense, is part of an intellectual community that recognizes the participatory nature of the learning process and honours and respects a wide range of opinions and ideas. However, "respect" appears in a very particular sense when students attend class, pay attention, contribute to discussion and submit papers on time; instructors "show respect by taking students' ideas seriously, by recognizing them as individuals, helping them develop their ideas, providing full and honest feedback on their work, and valuing their perspectives and their goals" ("[The Fundamental Values of Academic Integrity](#)", 3rd Edition, p. 8).

Ultimately, responsibility is both personal and collective and engages students, administrators, faculty and staff in creating and maintaining a learning environment supported by and supporting academic integrity.

Courage differs from the preceding values by being more a quality or capacity of character – "the capacity to act in accordance with one's values despite fear" ("[The Fundamental Values of Academic Integrity](#)", 3rd edition, p. 10). Courage is displayed by students who make choices and integrous decisions that are followed by action, even in the face of peer pressure to cheat, copy another's material, provide their own work to others to facilitate cheating, or otherwise represent themselves dishonestly. Students also display courage by acknowledging prior wrongdoing and taking proactive measures to rectify any associated negative impact.

All of these values are not merely abstract but are expressed in and reinforced by the University's policies and practices.

Syllabus statements for Generative Artificial Intelligence (AI) Tools (select one of the following)

Use of Generative Artificial Intelligence (GenAI) Tools

a) AI Use Statement: State whether the use of GenAI tools is permitted or not in the course. The statement should reflect one of the following positions:

Permitted with citation:

Students must submit their own work and cite the work that is not theirs. Generative AI writing tools such as ChatGPT are welcome in this class, provided you cite the material that they generate. Any other use constitutes a Departure from Academic Integrity.

Queen's [Student Academic Success Services](#) (SASS) offers a self-directed, online academic integrity module which we encourage all students to take which will help with:

- Understanding the nature of the academic integrity departure
- Understanding the expectations of and role of sources in scholarly writing
- Integrating sources into your writing (paraphrasing, quoting, summarizing)
- Understanding when and how to cite your sources
- Managing your time effectively to avoid the need for shortcuts
- Taking effective notes to ensure accuracy of source material and correct attribution

30. Turnitin Statement-Mandatory if using Turnitin

This course makes use of Turnitin, a third-party application that helps maintain standards of excellence in academic integrity. Normally, students will be required to submit their course assignments through onQ to Turnitin. In doing so, students' work will be included as source documents in the Turnitin reference database, where they will be used solely for the purpose of detecting plagiarized text in this course. Data from submissions is also collected and analyzed by Turnitin for detecting Artificial Intelligence ([AI-generated text](#)). These results are not reported to your instructor at this time but could be in the future.

Turnitin is a suite of tools that provide instructors with information about the authenticity of submitted work and facilitates the process of grading. The similarity report generated after an assignment file is submitted produces a similarity score for each assignment. A similarity score is the percentage of writing that is similar to content found on the internet or the Turnitin extensive database of content. Turnitin does not determine if an instance of plagiarism has occurred. Instead, it gives instructors the information they need to determine the authenticity of work as a part of a larger process.

Please read Turnitin's [Privacy Policy](#), [Acceptable Use Policy](#) and [End-User License Agreement](#), which govern users' relationship with Turnitin. Also, please note that Turnitin uses cookies and other tracking technologies; however, in its service contract with Queen's Turnitin has agreed that neither Turnitin nor its third-party partners will use data collected through cookies or other tracking technologies for marketing or advertising purposes.

For further information about how you can exercise control over cookies, see [Turnitin's Privacy Policy](#).

Turnitin may provide other services that are not connected to the purpose for which Queen's University has engaged Turnitin. Your independent use of Turnitin's other services is subject solely to Turnitin's Terms of Service and Privacy Policy, and Queen's University has no liability for any independent interaction you choose to have with Turnitin.

Portions of this document have been adapted, with permission, from the University of Toronto Centre for Teaching Support and Innovation tip sheet "[Turnitin: An Electronic Resource to Deter Plagiarism](#)".

31. Copy rights use statement:
<https://www.queensu.ca/secretariat/policies/administration-and-operations/copyright-compliance-and-administration-policy>