

## Five-Year Academic Program Review

### **Cell and Developmental Biology**

Reviewed by: Chuck Allen, David Covell, Paul Gorman

Reviewed on: June 24, 2013

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# Five Year Academic Program Review

## 1. Introduction

**Program Name:** *Graduate Program in Cell and Developmental Biology*

1.1 Identify the participants in the self-evaluation process. Please select all that apply.

- Faculty       Alumni  
 Students       Employers  
 Staff       Others, please specify

1.2 When were meetings held to complete this self-evaluation process?

*Issues concerning graduate education are frequently discussed at monthly CDB faculty meetings. The co-directors of the CDB graduate program meet frequently with the chair of the department to discuss the graduate program. The co-directors also seek advice from the CDB Graduate Program Executive Committee. In the course of day-to-day operations of the CDB graduate program, the co-directors and the graduate program coordinator frequently receive input from students and faculty about program policy and procedures.*

1.3 Who prepared the document?

*Richard Maurer, Director; Philip Copenhaver, Co-Director; and Elaine Offield and Lola Bichler, CDB Graduate Program Coordinators.*

1.4 Who reviewed the report?

*The CDB Graduate Program Executive Committee consisting of Richard Maurer, Philip Copenhaver, Caroline Enns, Melissa Wong and Philip Stork.*

1.5 Describe the program's process for eliciting feedback from faculty on the APR report.

*The self-evaluation was discussed at a meeting of the CDB Graduate Faculty (both primary and affiliated) on June 4, 2013.*

## 2. Overview

2.1 Describe the program:

**Program Mission:** *The Graduate Program in Cell and Developmental Biology (CDB) prepares future biomedical scientists and educators to address the causes and possible treatment of disease by investigating the fundamental components of cells and tissues and how they contribute to the function of the whole organism, and understanding the principles required to develop novel therapeutics.*

**Program Purpose:** *CDB has a long-standing commitment to educating the next generation of cellular, molecular, and developmental biologists, so that they can conduct high-quality research that enhances our understanding of the normal development and function of cells, tissues, and organisms, and how the misregulation of these processes contribute to diseases that affect human health. Included in this mission is training in the presentation and professional dissemination of ideas and discoveries to other scientists and the general community. **Our M.S. program** trains students to become contributing biomedical scientists, with the experience and training needed to participate in research programs during subsequent stages of their careers.*

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**Our PhD program** trains students to become biomedical scientists, capable of independent thought and research.

## Identify Program Goals:

The CDB Graduate Program seeks to train students to become biomedical scientists, capable of independent thought and research.

- 2.2 How do these align with, and contribute to, the fulfillment of OHSU's [mission](#), [strategic goals](#) and [core themes](#)?

Following is OHSU's mission statement as it appears on OHSU's web site. Underlined are elements to which the CDB Graduate Program contributes:

As part of its multifaceted public mission, OHSU strives for excellence in education, research and scholarship, clinical practice and community service. Through its dynamic interdisciplinary environment, OHSU stimulates the spirit of inquiry, initiative, and cooperation among students, faculty and staff.

Setting the example for integrity, compassion and leadership, OHSU strives to:

- Educate tomorrow's health professionals, scientists, engineers and managers in top-tier programs that [to] prepare them for a lifetime of learning, leadership and contribution.
- Explore new basic, clinical and applied research frontiers in health and biomedical sciences, environmental and biomedical engineering and information sciences, and translate these discoveries, wherever possible, into applications in the health and commercial sectors.
- Deliver excellence in health care, emphasizing the creation and implementation of new knowledge and cutting-edge technologies.
- Lead and advocate for programs that improve health for all Oregonians, and extend OHSU's education, research and healthcare missions through community service, partnerships and outreach

- 2.2 Describe the curriculum, and if more than one award is given, highlight the progression in difficulty and performance expectations.

Include the curriculum as a separate document.

The CDB Graduate Program is a part of the Program in Molecular and Cellular Biosciences (PMCB) at OHSU. Didactic training includes the PMCB Core Curriculum, including CONJ650: Practice and Ethics of Science, CONJ661: Structure and Function of Biological Molecules, CONJ 662: Genetic Mechanisms, CONJ 663: Bioregulation, CONJ 664: Cell Structure and Function and two of the following four courses, CONJ 665: Development, Differentiation & Cancer, CONJ 667: Organ Systems, CONJ 668: Molecular Biophysics & Experimental Bioinformatics and CONJ 669: Chemical Biology. In addition, CDB requires taking 3 elective courses selected from basic science graduate courses offered at OHSU and two journal club courses.

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*Throughout their training students are required to attend the CDB Departmental Seminar series (CELL 607) and present their research once a year. They should also participate in a graduate-level weekly Journal Club, e.g. CELL 606 (Developmental Biology Journal Club).*

*CDB Faculty teach in many of the conjoint courses. The CONJ 650 (Ethics and Practice of Science) is co-directed by CDB faculty members. Both CONJ 664 (Molecular Cell Biology) and CONJ 665 (Development, Differentiation, and Cancer) are co-directed and taught by CDB-affiliated faculty.*

*Most of the graduate courses offered by CDB are directed by CDB faculty and involve participation by CDB faculty, as well as other Graduate faculty at OHSU.*

*For additional details of the curriculum see Appendix 2.2 – CDB Graduate Program Guidelines and Curriculum.*

## **3. Faculty and Staff Resources**

- 3.1 Describe the major research thrusts of faculty, areas in which the research is particularly strong, areas that need to be strengthened and current research support.

*The breadth of research experiences within the CDB program has been enhanced by participation of a substantial number of joint faculty appointments. Thus, the research interests of the CDB faculty cover a broad spectrum of topics in many facets of cell and developmental biology. With the recent recruitment of Dr. Lisa Coussens as chair of the department, there will be considerable growth in cancer-focused research programs in the department. National searches are underway seeking to recruit new faculty in specific areas of cancer-focused cell and developmental biology.*

*[Table 3.1](#) provides more detailed information about the CDB faculty interests and activities. Note that the information about teaching, mentoring and service on committees is for 2012-2013 only. During this short interval, some of the faculty have had no activities in the graduate program, although they have been active participants in previous years.*

*Grant support of the faculty changes over time and information about grant funding can be obtained from the OHSU Research Grants and Contracts Office. With the exception of startup funds for junior faculty, there is very little internal funding for research. Therefore, nearly all of the stipend costs and thesis research of CDB graduate students are supported by grant funds.*

- 3.2 Describe how the program has maintained adequate qualified faculty members and staff members in relation to the program's enrollment, clinical and/or research efforts over the last five years.

*There are currently 8 primary faculty and 39 faculty with joint appointments in the CDB Graduate Program. The roster of primary faculty has undergone considerable fluctuation over the last 5 years, including the departure of several junior and senior faculty members. With the successful recruitment of Dr. Lisa Coussens to be the new departmental Chair (as of Oct. 2011), multiple new hires will rejuvenate the ranks of the primary faculty, and they will create new*

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*opportunities to expand the course offerings and training programs affiliated with our department.*

- 3.3 Provide data for the last five years illustrating program faculty: total number, rank and series numbers, number recruited, number retired or left position, number promoted or awarded tenure. Analyze the program's success in attracting and retaining faculty and leadership?

*In 2007, the CDB graduate faculty consisted of 11 primary faculty and 59 joint faculty. Currently, the graduate faculty of the department consists of 8 primary faculty and 39 joint faculty, of which 21 hold the rank of Professor or equivalent, 21 are Associate Professor or equivalent, and 5 are Assistant Professor or equivalent rank. The changes in the CDB graduate faculty from 2007 to 2013 involved recruitment of 7 faculty and retirement of 3 faculty. In addition, 9 faculty left OHSU for other institutions, and 18 faculty either left the graduate program or their joint appointment was terminated, due to inactivity in the program. Some of the departures of faculty for other institutions were related to uncertainty about the future directions of the department, following the retirement of the previous chair, Dr. Bruce Magun, in 2010. That uncertainty was removed when, following a national search, the School of Medicine recruited Dr. Lisa Coussens from the University of California, San Francisco to be the new chair of CDB. As indicated above, it is anticipated that CDB will be adding multiple new faculty members. While there has been a significant decrease in the total faculty of the CDB Graduate Program since 2007, much of the decrease reflects removal of faculty who lost interest and/or no longer actively participated in the program. The current 47 faculty members of the graduate faculty have strong research programs representing a number of areas of cell and developmental biology, which has maintained an appropriate training environment for graduate student thesis research.*

- 3.4 If your program is responsible for recruitment and retention, and efforts have not produced desired diversity, what are your plans to recruit diverse faculty? What resources will be used or are needed to achieve these results?

*CDB has worked with the Center for Diversity and Inclusion to enhance efforts to recruit a diverse faculty. Several faculty recruitment efforts are in process.*

- 3.5 What process is in place to evaluate faculty effectiveness and teaching quality? With what frequency do faculty get evaluated and what is the feedback mechanism?

*Annual review of primary faculty by the Chair of the department includes evaluation and discussion with each faculty member of teaching effectiveness.*

*Another part of evaluating teaching effectiveness involves student feedback. All participating students in each course are required to complete an evaluation of the course before receiving their final grade. Course evaluations are distributed, collected, and collated by the graduate program coordinator to ensure anonymity of the student evaluators. The course evaluation asks students to describe both the strengths and weaknesses of the course, its requirements, text, and examination format; students are also asked to evaluate the strengths and weaknesses of individual faculty lecturers. Each instructor receives a copy of the overall course evaluation as well as critiques relating to their lectures.*

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*Course directors prepare an evaluation of each CDB graduate course, based on their observation of other course lecturers, input from other lecturers and student feedback. Each directors' report includes a section describing changes made in response to previous course evaluations and a section concerning possible future changes in course content and/or lecturers. The reports are reviewed by CDB Graduate Program Executive Committee.*

## 4. Enrollment/Degree Production

- 4.1 Is the five-year enrollment trend appropriate to the program's capacity? What is the program's strategic plan to maintain or grow capacity?

*There has been substantial variation in the number of students entering the CDB program each year, so it is difficult to be confident of enrollment trends. With the recent development of the Cancer Biology Graduate Program, it seems likely that some students who might have previously selected the CDB program will now enter the Cancer Biology Program. This possibility should be evaluated in the years ahead and program adjustments considered. On the other hand, with the anticipated recruitment of new CDB faculty and development of new research programs, we anticipate an increase in our student population over the next several review cycles. CDB students enter the department through the PMCB, which serves as the umbrella program for several basic science departments. As the number of students entering PMCB is larger and more consistent than the number that enter CDB, it is possible to make conclusions about enrollment trends for PMCB. It is clear that there has been a significant decrease in the number of students entering PMCB over the last 10 years. This is a long term concern for each of the individual graduate programs that depend on PMCB for recruiting new students.*

- 4.2 Has the number and/or quality of matriculates changed in the last five years? If so, how? What is the impact?

*As indicated above, the number of students matriculating in the CDB Graduate Program has been quite variable. Based on review of the undergraduate grade point averages and Graduate Record Exam scores of the entering students, the quality of the students has not significantly changed in the last 5 years.*

- 4.3 In the last five years has the trend in awarding degrees and certificates been appropriate to the program's resources and capacity? What is the average time-to-degree for students in the program? What percentage of students complete their degree on time?

*Complete Table 4.3 below demonstrating the number and percentage of students completing on-time and those completing at the next benchmark. Adjust column headings and years to accurately reflect usual program time. (e.g., PhD's usual time = 6 years, next benchmark = 7 years; MD's usual time = 4 years, next benchmark = 6 years) Provide analysis of this data related to program effectiveness.*

*For students matriculating between 2004 and 2009, time to graduation has been about average for Ph.D. students at OHSU and nationally. About half of the CDB students complete degree requirements within 5 years. All of the students who remain in the*

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*program completed degree requirements within the time limit of 7 years established by the School of Medicine Graduate Council.*

**Table 4.3: Time-to-degree**

Year Enrolled	Total	Continuing	Dropped out	Completing Ph.D. within 5 Years (on-time)			Completing Ph.D. within 7 years (next benchmark)		
	#	#	#	Graduated by	#	%	Graduated by	#	%
2004-05	1 (2*)	1*	0	2008-09	1	100	2010-11	0	0
2005-06	4	4	0	2009-10	2	50	2011-12	2	50
2006-07	8 (9*)	8*	0	2010-11	4	50	2012-13	4	50
2007-08	6	6	0	2011-12	3	50	2013-14	3	50
2008-09	4	4	0	2012-13	3	75	yet to complete	1	25
2009-10	9 (13*)	7*	2	2013-14	2	22	yet to complete	5	78

**2004-05:** Although 2 students entered, one of those students transferred to the MS track. As the student who transferred to another program is not relevant to determine on-time graduation or drop out statistics, the entering number was adjusted to 1.

**2006-07:** 1 student transferred to another graduate Program at OHSU

**2009-10:** 3 transferred to new Cancer Biology Program (they entered CDB to complete their 1st year while the Cancer Biology Program was being established), 1 transferred to MS track, 2 withdrew from graduate school (dropped out)

- 4.4 In alignment with OHSU’s Vision 2020 strategic goal, “Be a great organization, diverse in people and ideas,” the university submitted core theme objective 1.1 to NWCCU for regional accreditation: *develop a student pipeline to meet the health needs of an increasingly diverse Oregon and nation.* The following indicator will demonstrate fulfillment of this objective: 20 – 30 percent of diverse students in OHSU programs, of total OHSU students.

What percentage of the program’s population is diverse (underrepresented minority, rural background, disadvantaged background)? How will the program endeavor to fulfill the university diversity initiative?

*Currently 6% (2/34) of students matriculating in CDB between 2008-2012 are under-represented minorities (URMs; self-reported ethnic or racial minority), which is slightly lower than that of the School of Medicine at OHSU (8.7%). Because our graduate program accepts students who matriculate either via the PMCB or MD/PhD admissions programs, the diversity of our student body is contingent upon recruitment by these programs.*

- 4.5 If you have not achieved desired results, what are your plans to recruit diverse students that add value to the learning environment? What resources will be used or are needed to achieve these results?

*CDB faculty will continue to work within PMCB to recruit diverse students. This includes CDB faculty attending national meetings that provide opportunities for recruiting underrepresented minority groups, as well as offering summer internships that seek to recruit a diverse student population.*

- 4.6 What is the evidence of regional, national or international need for additional qualified individuals such as the program is producing? Please specify.

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*In the short term, CDB graduates have had good success in obtaining postdoctoral positions in excellent laboratories at good institutions. This is consistent with the view the graduates of the program are well qualified, and that research funding in relevant fields has continued to be sufficient to support postdoctoral positions for capable graduates. At the present we do not have access to information about longer term employment outcomes.*

### 5. Other Resources

5.1 What revenue sources does the program have access to? Choose all that apply and include the percentage of the program's total revenue that comes from the selected sources:

- |                                                              |                                                     |
|--------------------------------------------------------------|-----------------------------------------------------|
| <input type="checkbox"/> Tuition ____%                       | <input type="checkbox"/> Philanthropy ____%         |
| <input type="checkbox"/> State Appropriations ____%          | <input type="checkbox"/> Indirect Cost Return ____% |
| <input type="checkbox"/> Clinical/Patient Care ____%         | <input type="checkbox"/> Research Grants ____%      |
| <input type="checkbox"/> Training Grants ____%               | <input type="checkbox"/> Contracts ____%            |
| <input type="checkbox"/> Other, please specify and include % |                                                     |

*It is not possible to address this question, as the support for the graduate program involves sources that intermingle funds supporting several different missions, not just the CDB graduate program. Funds to support the salaries of the CDB primary faculty and staff are provided at the discretion of the Chair of CDB from the departmental general fund. The general fund is used to support CDB missions in graduate and medical education, research and service, and the proportion of those funds directed to graduate education is not specified. The CDB graduate program does not have knowledge of the sources of funding used for the salaries of joint faculty. The funds for graduate student salaries and stipends are provided by research grants and contracts, fellowships, training grants, and occasionally funds from departments, centers or institutes. Funds for research supplies and equipment are provided by research grants and contracts and occasionally from departments, centers or institutes.*

5.2 What percentage of faculty are grant funded? What percentage of students are on faculty grants?

*CDB graduate students are predominantly funded by grants awarded to their mentor. In addition, a substantial number of students have won competitive traineeships from both intramural and extramural sources (see Section 6.1b). With the arrival of our new Chair (Dr. Lisa Coussens), we anticipate a re-invigorated effort to restore training grant support to augment the financial resources available for graduate training in our program.*

5.3 What is the current budget (present year) for this program?

*As indicated above, the funding for the graduate program is not a separate category in the department budget.*

5.4 How does tuition (or graduate stipends) compare to similar programs at other institutions (ideally, compare against programs on the institutional peer list)?

*Graduate student stipends (research assistant salaries) are determined by the SOM Graduate Council, following review of stipends at other institutions.*

5.5 What resources is the program utilizing to fulfill its mission (e.g. library, computer equipment, facilities, research labs, clinical placements)? What resources, if any, is the program sharing with other programs (facilities, computer equipment, labs, clinical placements)?



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*Research laboratories within the department and in other departments, institutes and centers are a key resource for thesis research. Many of the classroom activities associated with our program employ space that is managed by the SOM and shared with other departments and institutes. The library and computing resources at OHSU also augment our education programs, and specialized research cores are important to some graduate student research projects.*

5.6 Has anything happened since the last review that has influenced expenditures?

Yes       No

If “yes” was selected, please explain.

*The precipitous decline in funding from the NIH and other granting agencies has had a significant negative impact on the ability of CDB faculty to support graduate student training in their laboratories. This nation-wide crisis has been compounded at OHSU by the increased budgetary demands placed on CDB by the administration, which has eroded the ability of the department to help support graduate students in the laboratories of primary or affiliated faculty. Also contributing to this problem has been the loss of key training grant support for graduate students in our department. At present, there are no apparent mechanisms for restoring any of these funding sources in the near future.*

### Student Learning Outcomes and Assessment

5.7 What are the program’s student learning outcomes? How are student learning outcomes assessed? How is achievement defined and how do students receive feedback? What do these results communicate about program effectiveness?

#### **LEARNING OUTCOMES**

1. *Critically evaluate a defined body of knowledge relevant to their field*
2. *Identify significant and original problems that will impact human health*
3. *Design and conduct independent, innovative research in accordance with the scientific research method*
4. *Collect and store data in accordance with good lab practices*
5. *Demonstrate analytical skills*
6. *Accurately and professionally communicate results with others verbally and in writing*
7. *Produce written documents appropriate for publication*
8. *Understand and comply with current policies on rights of research subjects, copyright, ethics, malpractice, data ownership and use of animals, hazardous materials and rDNA*
9. *Maintain a safe workspace, adhere to all safety regulations and display responsible conduct in research*
10. *Develop and maintain good working relationships with all faculty, students and staff*
11. *Establish new connections within their field of research by attending seminars, meetings, symposiums or conferences thesis project and approval for scheduling the oral thesis defense.*

**For M.S:** *candidates must complete a mentored research project and complete a written thesis (usually 2-4 chapters) that places their work in the context of their current field of study.*

**For PhD:** *candidates must complete an independent research project and complete a written thesis (usually 3-6 chapters) that places their work in the context of their current field of study, provides full explanation of their independent research, and outlines future directions for further study.*

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## **ASSESSMENTS (FOR BOTH M.S. AND PH.D).**

- 3-4 Research Rotations during 1st year (as part of PMCB program; MD/PhD students follow program-specific criteria for rotations).
- 1st year comprehensive examination (administered by the PMCB program; MD/PhD students follow program-specific criteria for 1<sup>st</sup> year educational requirements).
- 2nd year qualifying examination (also coordinated by the PMCB program). Assessments involve oral and written evaluation of student performance by the chair of the examination committee (with input from all committee members). In the case of deficiencies, the student is informed in writing of areas that need to be addressed. In the case of a failed examination, the student is directed either to re-take the examination (with time for additional preparation) or direct to complete an MS rather than a PhD degree.
- 3<sup>rd</sup> year presentation of research (Departmental seminar); evaluation of oral presentation skills by CDB Graduate Studies Committee. Presentations are evaluated by a panel of faculty reviewers who provide written feedback concerning presentation strengths and weaknesses.
- Bi-Annual meetings with thesis advisory committee, through completion of thesis/dissertation. The committee prepares a written report that evaluates the student's progress, which is distributed to the student, the student's mentor, and the CDB graduate coordinator (as part of the student's assessment record).
- Written thesis and public thesis defense examination.
- For M.S: candidates must complete a mentored research project and complete a written thesis (usually 2-4 chapters) that places their work in the context of their current field of study.
- For PhD: candidates must complete an independent research project and complete a written thesis (usually 3-6 chapters) that places their work in the context of their current field of study, provides full explanation of their independent research, and outlines future directions for further study.

**QUALIFYING EXAMINATION.** The qualifying exam takes place at the end of the second year of graduate studies and is administered by PMCB. Information about the qualifying exam is contained in the PMCB by-laws. A student must pass the qualifying examination in its entirety before being admitted to candidacy for the Ph.D. degree.

**TERMINAL ASSESSMENTS.** For both M.S. and Ph.D. degrees, terminal assessment is through the student's ability to write a thesis that describes their research and conclusions, present their thesis work in a public forum, and defend this thesis to a committee of graduate faculty from OHSU. Oral and written feedback is provided concerning any issues that need to be addressed in the thesis documents and any areas that might be addressed to strengthen career development as an independent scientist.

**EMPLOYMENT OUTCOMES.** The average time to M.S. completion has been 1.5 years, and to PhD completion in CDB has been 6.4 years. Since 2008, only 2 student left CDB without earning a degree; one left to pursue a medical degree, and one left to pursue a non-science related career. **Appendix 6.1** summarizes the thesis titles and postgraduate outcomes of students who completed their degrees in CDB since 2008.

**Publications and Competitive Fellowships/Traineeships.** The publications of the graduate students and competitive support and awards provide a useful overall indication of effectiveness

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of the graduate program. The table below provides a summary for 2007-12. Appendices 6.1a,b,c contain detail data:

Graduates	PhD: <b>21</b> MS: <b>1</b> Current students: <b>28</b>
Student publications <i>Appendix 6.1a</i>	2007: 8 2008: 17 2009: 13 2010: 17 2011: 34 2012: 25 <b>Total since last review: 114</b>
Awards <i>Appendix 6.1b</i>	Extramural fellowships/trainee awards: 20 Competitive Intramural fellowships/awards: 36 Other awards (travel, presentations etc.): 41
<i>Appendix 6.1c</i>	Thesis titles and postdoctoral outcomes of students graduating with degrees from CDB since 2008

- 5.8 Summarize how assessment results are used to improve the program curriculum, learning experiences, instruction, student recruitment and/or academic and learning support.

*The co-directors periodically meet with the Chair of the department and/or the CDB Graduate Program Executive Committee to discuss student progress and performance and issues arising concerning graduate program policies and procedures. The Executive Committee also regularly reviews course evaluations prepared by the course director for each course.*

- 5.9 What percentage of students in the program have mentors? What percentage of students are retained? What percentage of students entering the program graduate?

*All students in the program have a mentor. The mentor provides guidance and financial support for thesis research.*

*Over the last 10 years, it has been unusual to have any students drop out of the program. However, of the students that matriculated in 2009-2010, 2 students dropped out. Both of these students were having academic difficulties and were given the opportunity to withdraw from the graduate program than be dismissed.*

- 5.10 What evidence does the program have about employment and/or further professional or graduate-level activities of program completers? What and how are alumni doing (e.g., industry or self-employment, geographic location, job, success indicators)?

*Review of positions obtained by CDB students following graduation indicates that our students obtained postdoctoral position at institutions with high quality research programs (**Appendix 6.1c**). At the present, there is no available data for long-term outcomes of departmental graduates. The proposal to establish permanent OHSU email addresses for all alumni would facilitate the collection of this information in the future.*

### 6. Other Information (optional)

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*Use this space to provide any additional information about the program, that would help the committee better comprehend the program and its effectiveness.*

*A number of factors have significantly affected our graduate program over the last 5 years. Several members of the primary faculty left OHSU to pursue careers in other academic environments, and lack of support from the School of Medicine has prevented their replacement with new recruits. The inability to retain senior faculty has also been a major factor in the loss of training grants in Cancer Biology and Developmental Biology that have historically supported a substantial number of CDB graduate students. As part of the Developmental Biology Training Grant, we also received an annual program review from the External Advisor Panel associated with this training program. The loss of the Developmental Biology Training Grant has also curtailed our ability to support an external review by qualified scientists. Predictably, these factors have resulted in the condensation or elimination of several elective courses that were previously offered by our faculty. Counteracting some of these negative elements, our department has continued to maintain a vibrant connection with faculty in many other departments and programs at OHSU, as manifested by the extensive number of faculty with joint or adjunct appointments in our department (see **Table 3.1**).*

*These additional faculty members have continued to support our graduate programs in a variety of ways, including participation in the required and elective courses and participation on graduate committees, and they have served as thesis mentors for a majority of the graduate students who have completed degrees our program.*

*With the arrival of a new chair in October 2011 (Dr. Lisa Coussens), we anticipate the rapid recruitment of new faculty who will augment the number of primary and secondary appointments in our program and will help rejuvenate our course offerings. Concomitant with these new arrivals, we anticipate a significant new direction in the types of courses and training programs that will be included in our graduate portfolio, with an emphasis on the cellular and molecular basis of cancer. Additional changes to the Department of Cell and Developmental Biology will undoubtedly result in a substantially expanded program over the next several years.*

## 7. Analysis and Conclusions

7.1 What are the strengths and achievements of the program's faculty, students and graduates?

*Over the last five years, the graduates of the program have an excellent record of producing peer-reviewed publications as part of their thesis research, and they<sup>8</sup> have successfully competed for fellowship and traineeship funding. Importantly, the graduates of the program have obtained excellent postdoctoral positions. The accomplishments of the students are made possible by a well-funed, productive faculty representing diverse areas of cell and developmental biology research.*

7.2 What areas does the program believe need strengthening over the next three to five years?

*To pay for the OHSU Overhead Cost Allocation (OCA) for research space, there is increasing pressure on faculty to raise more grant funds. This will likely have a negative impact on*

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*graduate programs. Whereas graduate students are important contributors to the OHSU research mission, their involvement in classes and other academic activities (as well as the time needed to introduce new students to a specific research project) usually means that there is a significant lag between their joining a laboratory and contributing meaningful findings. With the pressure from the administration to increase grant funding, training graduate students may become less attractive to an increasing number of OHSU faculty.*

*It seems likely that there will be opportunities for increased collaboration and interaction between the CDB Graduate Program and the Cancer Biology Cancer Program. Part of the academic foundation for the Cancer Biology Program came from the CELL 616, the graduate course in Cancer Biology that was developed within the CDB program. As CDB recruits new faculty with research interests in cancer biology, it should be possible to develop new courses that can contribute to both graduate programs.*

- 7.3 How will this self-study be used for improvement against goals and targets? How will it inform planning, decision making and allocation of resources and capacity for the next five years?

*Although most of the observations and conclusions contained within the self-study have been obvious for some time, the self-study has assembled this information into a summary document that should be useful to the Chair of the department, the CDB Graduate Program Executive Committee and the faculty and staff of the program as we seek to improve the program. In particular, it will be important to carefully track changes in student enrollment going forward and make necessary adjustments in the program.*

- 7.4 Are new resources needed to achieve these goals and improvement targets? What can the university do to better support the program?

*Perhaps the most important resource would involve mechanisms to improve recruitment of the most highly qualified students to the PMCB umbrella program. One of the primary reasons that PMCB was originally created at OHSU, was to improve the recruitment of graduate students. The long term trend appears to be that PMCB is recruiting a reduced number of students with similar academic records. To really strengthen our graduate programs, mechanisms need to be established to recruit the highest quality students. Improving the quality/capability of graduate students will also enhance the ability of CDB faculty to compete for grant funding at the national level, which will in turn benefit OHSU.*

## **8. Response to Previous Program Reviews**

*This section is completed by programs that have previously undergone a five-year academic program review.*

- 8.1 What commendations did the committee have in the previous review?
- 8.2 What recommendations did the committee have in the previous review?
- 8.3 What did the program do to respond to recommendations?
- 8.4 In the last five years, have there been any significant changes in the program due to the previous academic program review? Please describe.

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## 9. Signature and Submission *(signature and title of persons submitting the report)*



06-10-13



06-10-13

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(signature)

(date)

(signature)

(date)

Richard Maurer, Professor and  
Director, CDB Graduate Program

Philip Copenhaver, Professor and  
Co-director, CDB Graduate Program

**3.1. Program Faculty: Cell and Developmental Biology**

**May 2013**

Faculty Name, include credential	Primary Appointment	Research Area	Graduate Program Courses (2012-2013)	Graduate Student Mentorships (2012-2013)	Graduate Program Committees (2012-2013)	Other roles/ functions
<b>Primary Faculty</b>						
Copenhaver, Philip, Ph.D.	Professor, Cell & Developmental Biology	Cellular and molecular mechanisms of neuronal migration in development and disease	NEUS 625: Cellular and Molecular Neuroscience, co-director and lectures on overview of developmental neuroscience and mechanisms of neuronal migration, 3 hours; discussion leader, 15 hours CONJ 650: The practice and ethics of Science, discussion leader on managing student-mentor relations, 2 hours	Jenna Ramaker (NGP)	SOM Graduate Council Qualifying Exam Committee for Kang Wang, Madalynn Erb Thesis Advisory Committees for Jenna Ramaker, Jonathan Nelson, Ryan Gardner, Diana Parrish, Julia Peredery, Greg Scott, Molly Harding, Alexandra Harrold, Mandy Cook, Kang Wang, Caitlin Monaghan, Clayton Winkler	Co-Director, CDB graduate program
Coussens, Lisa, Ph.D.	Professor and Chair, Cell & Developmental Biology	My research focuses on the role of immune cells and their mediators during cancer development.	CELL616 Advanced Topics in Cancer Biology, Lectures on Tumor Microenvironment, 6 hours CONJ 665 Development Differentiation and Cancer, Co-Director, Lecturer, 3 hours	Rotation supervisor for Shannon Liudahl (PMCB), Xiaoming Ouyang (PMCB)	Executive Steering Committee for PhD Graduate Programs Qualifying Exam Committee for Derek Zachman (CDB) Thesis Advisory Committee for Tim Butler Thesis Exam Committee for Katelyn Atkins (CDB)	
Enns, Caroline, Ph.D.	Professor, Cell & Developmental Biology		CONJ 664 Molecular Cell Biology, co-director, lectures on Nuclear import, endocytosis, polarized cells and trafficking, 3 hours, exam proctoring, 3 hours CELL 606 Cell biology journal club, multiple terms, evaluation of student presentations and presentation on exosomes and signaling	Christal Worthen (CDB)	Qualifying Exam Committee for Rebecca Lazelle Thesis advisory committee for Jinzhi Wang, Christal Worthen, Rachel Clemens-Grisham, Rebecca Lazelle, Johannes Efferich, Jennifer Gardell, Christine Carlton, Kang Wang	

**3.1. Program Faculty: Cell and Developmental Biology**

**May 2013**

Maurer, Richard, Ph.D.	Professor, Cell & Developmental Biology	Pituitary hormone gene expression	CONJ 664, Cell Biology, 2 lectures on cell signaling, 2 hours Cell 622, Transcriptional Regulation, 13 lecture hours		PMCB Steering Committee SOM Conjoint Course Review Committee PMCB Student Advising Committee Thesis advisory committees, Aaron Wortham (CANB), Tiffany DeVine (MMG) Thesis Exam Committee, Nathan Donley (CDB)	Director, CDB graduate program
Nechiporuk, Alex, Ph.D.	Assistant Professor, Cell & Developmental Biology	Development of the peripheral nervous system in vertebrates	CONJ 665, Development, Differentiation, and Cancer, lecture on Introduction in cell polarity, 3 hours Cell 620, Model Systems in Biology, lecture and laboratory on Zebrafish, x h Cell 606, Developmental Biology Journal Club, course director Fall & Spring terms and 2 lecture hours	Mathew McCarroll (CDB) Molly Harding (NGP)	Thesis advisory committees, Lilly Winfree, Maria Purice	Seminar organizer - PMCB
Tyner, Jeffrey, Ph.D.	Assistant Professor, Cell & Developmental Biology	Identification of novel oncogenes for application of individualized gene-targeted therapies	CONJ 665 - Development, Differentiation and Cancer, lecture on hematopoiesis, 1.5 hours lecture on Immune System and Tissue Health, 1.5 hours CELL 616 - Advanced Topics in Cancer, lecture on Kinase Screens/Basic Science Hem Malignancy; 1 hour	Nathalie Javidi-Sharifi (CANB, co-mentor with Brian Druker), Marilyn Chow (CANB) Supervised rotations of David Edwards (PMCB) and Chelsea Jenkins (PMCB)	Awards Committee Professional Development Steering Committee Qualifying Exam Committees for Yulong Su, Derek Zachman (CDB) Thesis advisory committees for Alison Macleod (CDB), Derek Zachman (CDB)	
Wehrli, Marcel, Ph.D.	Associate Professor, Cell & Developmental Biology	Dissection of Wnt signaling dynamics in the Drosophila model system	CONJ 650 The practice and ethics of science. Discussion leader on Managing stress, anxiety and depression, 1 hour CELL 620 Model systems, lecture on the fruit fly Drosophila melanogaster as a model system, 1.5 hours		Qualifying Exam Committee for Nathalie Javidi-Sharifi (CANB) Thesis Advisory Committee of Jenna Ramaker (NGP)	Participated in 'Invertebrate Brunch', a forum providing an opportunity for graduate students to present research findings



**3.1. Program Faculty: Cell and Developmental Biology**

**May 2013**

Wong, Melissa, Ph.D.	Associate Professor, Cell & Developmental Biology	Molecular mechanisms underlying intestinal stem cell regulation in the context of intestinal development, tissue regeneration and disease	CONJ 650 The practice and ethics of science, lecture on managing mentor relationships CONJ 665 Development, Differentiation and Disease, co- director and lectures on NSF grant workshop, stem cell niche, proliferation to differentiation , oral presentations. CELL 616 Advanced Topics in Cancer Biology, Co-director and lecture on Cancer Stem Cells MGEN 624 Gene and Cell Therapy, reviewer of student midterm assignments CELL620, Model Systems Biology, co-director and lecture on mice	Supervised rotations of Charlie Gast (PMCB),Katherin Michaels (PMCB)	PMCB steering committee Cancer Biology Education Committee co-chair Qualifying Exam Committee for Derek Zachman (CDB) Thesis advisory committee for Branden Tarlow (CDB), Mahnaz Jangorborn, Derek Zachman (CDB) Thesis Defense Committee for Katelyn Atkins (CDB), Nathan Donley (CDB)	
<b>Joint Faculty</b>						
Adelman, John, Ph.D.	Senior Scientist, Vollum Institute	Potassium channels, Ca <sup>2+</sup> -activated, structure-function, synaptic transmission and plasticity		Kang Wang (CDB)	Qualifying Exam Committee for Andrew Terker (CDB)	
Banker, Gary, Ph.D.	Senior Scientist, Jungers Center	neurobiology, cell biology, protein trafficking, cell polarity				
Barnes, A. Paul, Ph.D.	Assistant Professor, Pediatrics	Signaling pathways involved in directing the patterning and specification of the cerebral cortex	NEUS 625 Developmental Neuroscience, lectures on Nervous system patterning and signaling and neuronal migration, 3 hours	Biliana Veleva- Rotse	Qualifying Exam Committee for Caitlin Monaghan Thesis Advisory Committees for Jonathan Nelson, Molly Harding (CDB), Rachel Clemons-Grisham (CDB)	
Brigande, John, Ph.D.	Associate Professor, Otolaryngology	Cell fate specification and pattern formation in the developing mouse inner ear	NEUS 606 Oregon Hearing Research Center Journal Club, Director NEUS 625, Cell and Molecular Neurobiology, lecture on Neural Induction and Patterning, 1.5 hours		Neuroscience Graduate Program Admissions Committee Thesis Advisory Committees for Matthew McCarroll (CDB), Maddie Erb, Karen Thiebes	

**3.1. Program Faculty: Cell and Developmental Biology**

**May 2013**

Cohen, David, M.D.	Professor, Nephrology	Genetics, cell biology, and physiology of water balance and osmoregulation			Qualifying Exam Committee for Andrew Terker (CDB)	
Danilchik, Michael, Ph.D.	Professor, School of Dentistry	Cellular basis of morphogenesis in Xenopus				
Druker, Brian, Ph.D.	Professor, Hematology-Oncology	Activated tyrosine kinases, signal transduction, and cellular transformation in cancer therapies		Nathalie Javidi-Sharifi (CANB) Marilynn Chow (CANB) Kevin Watanabe-Smith (CANB)	Thesis Advisory Committee for Nathalie Javidi-Sharifi	
Fleming, William H. M.D. Ph.D.	Professor, Pediatrics	Normal and malignant hematopoietic stem cells: Interactions with the vascular microenvironment	CELL 616 Advance Topics in Cancer Biology, lecture on Hematopoietic Malignancies	Derek Zachman (CDB)	Thesis Advisory Committees for Branden Tarlow (CDB), Alison Macleod (CDB), Ashley Kamimae-Lanning (CDB), Huiyan Yao (CDB), Derek Zachman (CDB)	
Gillespie, Peter, Ph.D.	Professor, Otolaryngology	Molecular basis of mechanotransduction by hair cells	NEUS 625 Molecular and Cellular Neurobiology "Axon guidance and target recognition", "The neuronal cytoskeleton and axonal transport", 3 hours total NEUS 627 Systems Neuroscience "Peripheral auditory system", 1.5 hours total	Supervised rotation of Zachary Urdang	NGP Executive Committee Thesis Advisory Committee for Jinzhi Wang (CDB)	Program Director, T32 NS007466, Multidisciplinary Training in Neuroscience
Goodman, Richard, MD, Ph.D.	Director and Senior Scientist, Vollum Institute	In vivo gene expression profiling, microRNAs, proteomics	NEUS 625 Cellular and Molecular Neurobiology, lecture on RNA editing in neuronal systems, 1.5 hours	Stephen Magill	Qualifying Exam Committee for Gabe Knoll Thesis Advisory Committee for Huiyan Yao (CDB), Bob Cargill, Yulong Su Thesis Defense Committee for Isabelle Baconguis, Jeff Hubbard	Career Development Seminars on Job Applications and Managing your first lab Program Director, T32 DK007680, Multidisciplinary training in neuroendocrinology

**3.1. Program Faculty: Cell and Developmental Biology**

**May 2013**

Heinrich, Michael, M.D.	Professor, Hematology/ Medical Oncology	Molecular characterization of oncogenic kinases in human cancers, including genomic and biochemical analysis		Alison Macleod (CDB), Lilli Welch (CANB), Amber Bannon (CDB)	Review Committee, T32 HL007781, Training program in molecular hematology Qualifying Exam Committees for Stacey Lin, Derek Zachman (CDB) Thesis Advisory Committees for Ashley Kamimae-Lanning (CDB), Nathalie Javidi-Sharifi, Alison Macleod (CDB)	
Hurlin, Peter, Ph.D.	Associate Investigator, Shriners Hospital	MYC, MNT and mechanisms of development, developmental disorders and cancer	CONJ 662, Bioregulation, lecture on transcriptional regulation by MYC and MYC antagonists, 1 hour and 1 hour literature review discussion			
Impey, Soren, Ph.D.	Assistant Professor, Stem Cell Center	Role of DNA methylation in embryonic stem cell and neuronal differentiation	CONJ 662, Bioregulation, two lectures on chromatin dynamics, 3 hours CONJ 665 - Development, Differentiation and Cancer, lecture on epigenetics and cancer, 1.5 hours Cell 622 Transcriptional Regulation, 2 lectures on Dynamics of DNA methylation, 2 hours MGEN 624 Gene and Cell Therapy, lecture on Neural Stem Cells, 1.5 hr	Liangqi Xie (CDB) Supervised rotation of Yuhan Wang (PMCB)	PMCB Admissions Committee Qualifying Exam committee for Tim Butler Thesis Advisory Committees for Nathan Donley (CDB), Yulong Su Thesis Defense Committees for Nathan Donley (CDB), Eric Stoffregen	
Johnstone, Brian, Ph.D.	Professor, Medicine - Orthopedics	Stem cell differentiation and tissue engineering of skeletal tissues; mechanisms of osteoarthritis	MGEN 624 Gene and Cell Therapy, lecture on mesenchymal stem cells, 2 hours	Devon Anderson		

**3.1. Program Faculty: Cell and Developmental Biology**

**May 2013**

Keller, Charles, M.D.	Associate Professor, Pediatrics	Development of novel molecular therapies for advanced childhood solid tumors	CONJ 665 Development, Differentiation and Cancer, 1.5 h lecture CELL 616 Advanced Topics in Cancer, 1.5 h lecture CANB Cancer Biology Seminar Series, 9 h			
Kulesz, Martin, Ph.D.	Professor, Dermatology	Causes and molecular targets for patient-specific treatment of skin/mucosal inflammation and cancer	CONJ 605 PMCB First Year Student Journal Club CONJ 665 Development, Differentiation and Cancer, Course Co-director, lecture on Acute Wound Healing, 1.5 hours	Aaron Wortham (CANB) Supervised rotation of Xiaoming Ouyang (PMCB)	Thesis advisory committees for Jennifer Johnson (MMG), Kathryn Van Hook (CDB), Tiffany Devine (MMG), and Sam Higgins (Bioinformatics)	Program Director, T32 CA106195, Training in the molecular basis of skin/mucosa pathobiology
Kurre, Peter, M.D.	Associate Professor, Pediatrics	Benign and malignant hematopoietic stem cells	MGEN 624 Lentiviral Stem Cell gene therapy, Discussion Group leader, 2 hours CONJ 650: The Practice and Ethics of Science, Discussion Group leader, 4 hours	Ashley Kamimae-Lanning (CDB) Noah Hornick (MMI) Supervised rotation of Shannon Liudahl (PMCB)	Qualifying Exam Committee for Derek Zachman (CDB) Thesis Advisory Committee for Ashley Kamimae-Lanning (CDB)	
Lee, Jae, Ph.D.	Professor, Pediatrics	Gene regulation in metabolism	Cell 622 Topics in Transcriptional Regulation, 2 lectures on Interplay between tumorigenesis and metabolism, 2 hours	Bora Lee (CDB)		
Lee, Soo-Kyung, Ph.D.	Associate Professor, Pediatrics	Neurodevelopment, spinal cord, motor neuron, neurogenesis, cell fate specification			Thesis Defense Committee for Katelyn Atkins	
Lopez, Charles, M.D., Ph.D.	Associate Professor, Hematology/Medial Oncology	Basic cellular and molecular mechanisms of how tumors form and respond to treatment	CELL 616 - Advanced Topics in Cancer, lecture on targeted therapies and cancer, 1 h MGEN 605 Cancer Biology Journal Club	Katy Van Hook (CDB)	Qualifying Exam Committee for Stacey Lin Thesis Advisory Committee for Katy Van Hook	
Mayinger, Peter, Ph.D.	Associate Professor, Nephrology & Hypertension	Phosphoinositide signaling pathways involved in membrane trafficking and their roles in human disease	CONJ 664, Cell Structure and Function, Course co-director, lectures on the Golgi apparatus, vesicular transport	Jinzhi Wang (CDB)	PMCB Admission Committee PMCB Steering Committee Thesis Advisory Committees for Christal Worthen (CDB), Jinzhi Wang (CDB), Rebecca LaBelle (PP2), Lisi Amsler (MMI)	

**3.1. Program Faculty: Cell and Developmental Biology**

**May 2013**

McCarty, Owen, Ph.D.	Assistant Professor, Biomedical Engineering	Understanding the interplay between cell biology and fluid mechanics in the cardiovascular system	CONJ 605, Practice & Ethics in Science, Lecturer Fall 2012 CONJ 667 Organ Systems, Director and lectures BME 650, Teaching Practicum, Director & Lecturer HIP 514, Molecular and Cellular Approaches to Disease, Lecturer MGEN 605, Cardiovascular Journal Club, Director & Lecturer PHPH 607, Grant Writing, Co-Director & Lecturer,	Asako Itakura (CDB)	SOM Graduate Council ARCS Selection Committee OSU Academic Program Review Review Committee, T32 HL007781, Training program in molecular hematology Thesis Advisory Committee for Asako Itakura (CDB)	Director of BME Graduate Program
Morton, David, Ph.D.	Professor, School of Dentistry	Drosophila neurobiology, cyclic GMP signaling, neurodegeneration especially ALS	NEUS 625, Cell and Molecular Neurobiology, lecture on Cell Signaling I, 1.5 hr	Kayly Lembke	Qualifying Exam Committee for Kang Wang (CDB)	
Muldoon, Leslie, Ph.D.	Associate Professor, Neurology	Brain tumor imaging and therapy, and role of integrin adhesion proteins in brain metastasis		Heather McConnell		
Musil, Linda, Ph.D.	Associate Professor, Biochemistry	Regulation of lens development and function by growth factors; folding, transport, assembly, and degradation of gap junction proteins	CONJ 664 Molecular Cell Biology: Course director, lectures, 3 hours CELL 605 Cell Biology Journal Club, multiple terms, director		PMCB Admissions Committee Thesis Advisory Committees for Jinzhi Wang (CDB), Diala Abu-Hassan Qualifying Exam Committees for Nathan Montgomery, Danielle Williamson, Jessica Martin	
Nicolson, Teresa, Ph.D.	Associate Professor, Otolaryngology	The molecular basis of mechanotransduction and synaptic transmission in zebrafish hair cells	NEUS 635 Topics in Neuroscience, Genetic model systems in neuroscience, 2 h NEUS 607 Seminar, 26 h CELL 620 Model Systems Biology, The zebrafish model system, 4 h NGP Bootcamp, Experiments with Zebrafish, 4 h MGEN 622 Eukaryotic Genetics, The zebrafish model system, 3 h	Rachel Clemens-Grisham (CDB) Zev Einhorn Weike Mo (CDB)	Advisory Committee for NGP NGP Admissions Committee NDP Curriculum Committee (chair) Vollum Career Development Workshop Series Qualifying Exam Committee for Kang Wang Thesis advisory committees for Kateri Spinelli, Molly Harding	

**3.1. Program Faculty: Cell and Developmental Biology**

**May 2013**

Patton, Bruce, Ph.D.	Assistant Scientist, Center for Research on Environmental Toxicology	Extracellular matrix in neuromuscular development, including nerve and muscle growth, myelination, and synapse formation				
Planck, Stephen, Ph.D.	Professor, Ophthalmology	Pathogenesis of inflammatory diseases of eyes and joints	CONJ 665, Development, Differentiation, and Cancer, Lecture on Normal Tissue Structure, 1.5 hours			
Roberts, Charles, Ph.D.	Senior Scientist and Associate Director for Research, Oregon National Primate Research Center	Insulin/insulin-like growth factor action in islet and adipose tissue function				
Rotwein, Peter, M.D.	Professor, Biochemistry	Growth factor biology, gene regulation	CONJ 664, Molecular Biology of the Cell, 2 lecture hours on cell signaling		Quantitative biosciences steering committee	
Schweitzer, Ronen, Ph.D.	Associate Investigator, Shriners Hospital	Developmental biology of tendons and tendon matrix				
Sherman, Larry, Ph.D.	Senior Scientist, Primate Center	Regulation of neural progenitor cells; mechanisms of cognitive dysfunction following chemotherapy	NEUS 625: Cellular and Molecular Neuroscience, Lectures on Developmental Neurobiology	Clayton Winkler (NGP)	PMCB Steering Committee Thesis Advisory Committees for Julia Perederly, Jenna Ramaker, Ryan Gardner, Amy Packard, Rebecca Williams	
Skach, William, Ph.D.	Professor, Biochemistry	Pathogenesis of human protein folding diseases; cystic fibrosis and CFTR biogenesis	CONJ 664, Molecular Biology of the Cell, co-director, 3 lecture hours on Introduction to the Endoplasmic Reticulum, Protein targeting and intracellular compartmentation and Protein degradation CON664 Journal Club, discussion leader Human Investigations Program (HIP) 1 hour of lecture		PMCB Steering Committee MD/PhD Advisory Committee Thesis Advisory Committees for Andrew Hadd, Danielle Williamson, Jessica Martin, Amber Jones-Hackathorne Thesis Examination committees for Dustin McCraw, Jessica Martin, Amber Jones-Hackathorne	Contributor to 1st year PMCB comprehensive exam

**3.1. Program Faculty: Cell and Developmental Biology**

**May 2013**

Spindel, Eliot, M.D., Ph.D.	Senior Scientist, Primate Center	Lung cancer, lung development, smoking and pregnancy				
Streeter, Philip	Associate Professor, Medicine- Hematology	Regenerative medicine, in vivo imaging/targeting, and pancreatic cancer diagnostics/therapy	CONJ 665 Development, Differentiation, and Cancer, Lecture on Diabetes, 1.5 hours		Thesis Advisory Committees for Diala Abu-Hassan, Derek Zachman	Informal presentation to Graduate Student Group on Basic Flow Cytometry, Spring 2013
Stork, Philip, M.D.	Senior Scientist, Vollum Institute	Signal transduction via kinases and phosphatases, regulation of cell growth and differentiation	NEUS 625, Cell and Molecular Neurobiology, director and lectures on kinase signaling, phosphatase signaling, G protein signaling, 8 hours.	Yumi Kariya, visiting graduate student, University of Tokyo	Cancer Biology Steering Committee Cancer Biology Graduate Education Committee Neuroscience Graduate Program Curriculum Committee Qualifying Exam Committee for Andrew Terker (CDB) Thesis Advisory Committees for Asako Itakura (CDB), Christal Worthen (CDB)	
Westaway, Shawn, Ph.D.	Assistant Professor, Neurology	Statistical genetics and genomics to study rare or orphan diseases and neurodegenerative diseases	HIP 514 Molecular and Cellular Approaches to disease, 1 hour lecture		PMCB admissions committee	

## Department of Cell & Developmental Biology Graduate Program Guidelines & Regulations

- I. **Introduction.** To complete the requirements for the Ph.D. degree, graduate students in the Department of Cell & Developmental Biology must successfully complete required and elective courses, attend CDB departmental seminars, pass a qualifying examination, perform research and write and defend a thesis. The program requires the completion of at least 135 term-hours of course credit, of which 100 hours must be in either departmental courses or con-joint courses. Generally, students are expected to enroll in 12-16 credit-hours per quarter (including summer quarter).

Students usually enter the CDB graduate program through the Program in Molecular and Cellular Biosciences (PMCB). The first year of graduate studies in the PMCB program involves three laboratory research rotations and completion of core courses (CON605, CON650, CON661, CON662, CON663, CON664 and two of CON665, CON667 and CON668) that contribute to fulfilling CDB course requirements (see below).

- II. **Required courses.** The following courses must be successfully completed with a grade of “B” or better except for courses graded on a pass/not-passed (P/NP) basis for which a grade of P must be received.

Course Number	Title	Term	Credit Hours
CELL607A	CDB Departmental Seminar	All terms after PMCB	
CON605	PMCB Literature and Journal Club	Fall/Winter/Spring	6
CON650	Practice and Ethics of Science	Fall	1
CON661	Structure and Function of Biological Molecules	Fall	3
CON662	Genetic Mechanisms	Fall	3
CON663	Bioregulation	Winter	3
CON664	Cell Structure and Function	Winter	3
	Two Journal Club Courses	Any term	>2
	3 Elective Courses	Any term	>6
Two of the following three Conjoint courses			
CON665	Development, Differentiation and Cancer	Spring	3
CON666	Organ Systems	Spring	3
CON667	Molecular Biophysics and Experimental Bioinformatics	Spring	3

- A. **Credit for previous course work.** If a student feels that they have completed an equivalent, graduate-level course to any of the required courses, they may petition to have the course requirement waived. To petition, the student should write a memo to the



- Director of the CDB Graduate Program requesting that the course requirement be waived and explaining why the student feels that the previous course is equivalent to the required course. A course outline or syllabus that indicates the subjects covered by the previous course should be included with the memo.
- B. **CDB Departmental Seminar.** All students are required to enroll in and attend CELL 607A, CDB Departmental Seminar, throughout their graduate tenure. Students are required to present a Departmental seminar on their thesis work during the second year of graduate studies and at least once more before graduation (usually in the 3<sup>rd</sup> or 4<sup>th</sup> year).
- C. **Journal Clubs.** Students are required to enroll in at least two-hours of journal club courses prior to taking their qualifying exam. Possibilities include the Cell Biology Journal Club and the Developmental Biology Journal Club.
- D. **Elective Courses.** CDB requires that students successfully complete at least three elective graduate courses offered by CDB or other departments on campus prior to taking their qualifying exam. Below is a listing of some of the more popular electives taken by our students:
1. **CELL 611, Histology – The Structure and Function of Cells in Tissues.** Offered every other year. Introduction to the organization and differentiated function of the major tissues and organs of the body. Students will develop expertise in the histological identification of tissues and organs under the light microscope. One hour per week will deal with discussion of a paper that uses histological or histochemical analysis of tissues in combination with transgenesis or other molecular approaches.
  2. **CELL 615, Developmental Neurobiology.** Offered every other year. Topics covered include (i) Patterning of the vertebrate nervous system, (ii) mechanisms of cell determination, (iii) neural cell migration and growth cones, (iv) mechanisms of target recognition and synaptic plasticity, and (v) role of cell death.
  3. **CELL 616, Cancer Biology.** Offered every year. Topics covered include (i) cell cycle, (ii) growth factor signalling pathways, (iii) role of transcription factors in cell cycle control, (iv) DNA damage and repair, and (v) mechanisms of carcinogenesis.
  4. **CELL 618, Mechanisms of Development.** Offered every other year. Topics covered include i) signal transduction and transcriptional regulation of cell fate, ii) RNA localization and translational control of development, iii) asymmetric cell division, iv) embryonic inductions, v) signaling networks that establish the major body axes, vi) stem cell plasticity and vii) organogenesis.
  5. **CELL 620 Model Systems Biology.** Offered every other year. This course provides an introduction to the biology and genetics of the major animal model systems as well as laboratory demonstrations of state-of-the-art techniques. Students will gain a solid understanding of how mice, zebrafish, *Xenopus*, chickens,

flies, moths and nematodes are used as tools to study key cell and molecular biology problems. This will help students better interpret the results of the many papers coming out each day in major journals. This course should also aid in making informed choices of thesis and qualifying exam topics. Grades will be based on student presentations of current topics and a final exam. Students at all levels are encouraged to participate.

6. **CELL 622, Topics in Transcriptional Regulation.** Offered every other year. Specific topics concerning mechanisms regulating gene expression will be covered. Some topics will focus on the role of particular transcription factor or co-activator families. Other topics will examine the role of transcriptional changes in regulating physiological processes. The course will involve lectures by faculty and interactive discussion of current papers. Students will be required to prepare a written research proposal. Prerequisite: CON663.

III. **Academic Progress.** The department requires that graduate students maintain an overall 3.0 grade point average in coursework (A = 4; B = 3; C = 2; D = 1). Courses graded on a P/NP basis do not contribute to calculation of the grade point average. If a student's cumulative grade point average drops below 3.0, the student will be placed on academic probation, requiring that he/she bring up his/her grade point average to at least a 3.0 within the next 12 months. Please note that academic probation may limit the availability of some kinds of student loans or other financial aid (for further information contact Registrar's office). Any student who fails to achieve a grade point average of 3.0 within the one year time limit will be subject to dismissal from the department.

Students must earn a grade of "B" or better in required courses (defined in Section II). A student who receives a "C" or worse grade for a required course will be placed on academic probation. To remove academic probation due to a poor grade for a required course, the student must achieve a grade of "B" or better for that course within the next 12 months. A student who fails to remove academic probation due to a poor grade in a required course within the one year time limit will be subject to dismissal from the department.

Graduate students must make appropriate progress in research activities. A CDB student who receives a grade of not-passed (NP) for a research registration (CELL 503, 601 or 603) will immediately be placed on academic probation. Academic probation status will be removed when a grade of passed (P) is received for a subsequent research registration. Students who receive a grade of NP for a total of two terms of research registration (CELL 503, 601 or 603) will be subject to dismissal from the department.

Following advancement to candidacy, students must meet with their thesis advisory committee on a regular basis. Students who do not meet with their thesis advisory committee within six months of advancement to candidacy or within 12 months of a previous thesis advisory committee meeting will be placed on academic probation. Students who do not meet with their thesis advisory committee within one year of advancement to candidacy or within 18 months of a previous thesis advisory committee meeting will be subject to disciplinary action including dismissal.

- IV. **Ethical and Professional Behavior.** CDB graduate students are expected to maintain high ethical standards. Graduate students should demonstrate honesty in all aspects of research activities. Students should learn about and avoid sources of error in scientific research. It is essential that students do not misrepresent scientific findings or misappropriate credit. All graduate students are required to take a course concerning ethics and science. Students should show cooperation, responsibility and respect in working with other students and faculty. Students should be considerate of the cultural and individual diversity of their colleagues.

Students who are involved in unethical or unprofessional conduct such as cheating, misrepresentation of research findings, plagiarism (failure to credit the original author) or disruption of the learning process are subject to disciplinary actions including dismissal from the department.

It should also be noted that students observing unethical behavior by students, faculty or others on campus are obligated to bring these transgressions to the attention of the appropriate person.

- V. **Student Salaries/Stipends.** For the first, PMCB year of graduate studies, the graduate research assistant salary is supported by the PMCB program. At the completion of the PMCB year, students select a department and a faculty mentor to direct their research. When students enter the CDB graduate program and select a faculty mentor, the faculty mentor becomes responsible for financial support of the student's graduate research assistant salary. Eligibility for continuing financial support of salary/stipend is dependent on timely and appropriate progress in course work and research. It should be noted that the Department/School is not responsible for continuing support of student salary/stipends.
- VI. **Qualifying Examination.** The qualifying exam takes place at the end of the second year of graduate studies and is administered by PMCB. For information about the qualifying exam, please contact the PMCB office. A student must pass the qualifying examination in its entirety and fulfill all PMCB and CDB academic requirements before being admitted to candidacy for the Ph.D. degree.
- VII. **CDB Graduate Studies Committee.** This committee will serve as general oversight of the CDB graduate program. This committee will also serve as the PMCB departmental qualifying exam subcommittee. This committee will also review and approve appointments to thesis advisory committees.
- VIII. **Thesis Advisory Committee.** Immediately following passing the qualifying exam, students in consultation with their mentor should nominate a Thesis Advisory Committee. This committee consists of the mentor and at least three other faculty members, with at least one committee member from outside of CDB. Members of this committee should be chosen based on their research area or technical expertise. The main purpose of this committee is to provide the student with guidance periodically during thesis research. Members of this committee may also serve subsequently on the Thesis Examination Committee. In this way, these faculty members will be familiar with the research, and will have the opportunity to communicate possible concerns they may have about your work early to allow time to address these concerns.

Committee membership must be approved by the CDB Graduate Studies Committee. A memo nominating the Thesis advisory committee should be sent to the chair of the CDB Graduate Studies Committee. Students must meet with their Thesis Advisory Committee within 6 months of passing the Qualifying Examination and at least once a year after the initial meeting. Thesis Advisory Committee meetings will usually involve oral presentation by the student of thesis research goals and progress. During the initial meeting, one member of the committee should be selected to serve as chair of the committee. Following each committee meeting, the chair should prepare a brief memo evaluating the student's progress which should be sent to the chair of the CDB Graduate Studies Committee.

- IX. **Student Seminar – Third Year.** Students will present a research seminar during the third year of graduate studies. A meeting with the thesis advisory committee should be scheduled within two weeks of seminar to discuss the project and future directions.
- X. **Thesis and Oral Thesis Examination:** Candidates for the Ph.D. degree must present a written description of the experimental investigation carried out during their course of study in the form of a thesis. Information on the format of the thesis and the oral thesis examination should be obtained from the office of the Associate Dean for Graduate Studies. Students who defend their thesis near the end of the spring term should note deadlines established by the School of Medicine. The thesis must demonstrate ability on the part of the student to plan and execute original experimental work, and the results must represent a definite contribution to scientific knowledge. Although there is flexibility in the amount of work required for the thesis, in general the thesis should represent the equivalent of at least two publications in significant, peer-reviewed journals. **CDB requires that the Thesis Advisory Committee must meet to review and approve the proposed thesis research before a thesis defense can be scheduled. The chair of the Thesis Advisory Committee should send a memo to the chair of the CDB Graduate Studies Committee recording approval of the thesis project and approval for scheduling the oral thesis defense.** The composition of the Oral Thesis Examining Committee should be suggested by the student and mentor, and must be approved by the CDB Graduate Studies Committee and the department chair. After these approvals are obtained, final approval of the composition of this committee must be obtained from the Associate Dean for Graduate Studies.
- XI. **Time limit for completing degree requirements.** It is School of Medicine Graduate Council policy that students must complete all requirements for the Ph.D. within 7 years of matriculation. Students that do not complete degree requirements within this deadline may be dismissed from the graduate program. Students, mentors and the Thesis Advisory Committee should consider this deadline when evaluating thesis research goals and progress.
- XII. **Exceptions.** No exceptions from the policies and procedures described in these guidelines can be made without approval by the CDB faculty. In matters related to coursework, exceptions must first be approved by the CDB Graduate Studies Committee before review and consideration for approval by the CDB faculty.
- XIII. **General Timetable for most graduate students** (12-16 credit-hours should be taken each term, including Summer terms):

**A. Year 1 – PMCB Core Courses.**

The main goal for the first year is to pass coursework with a "B" or better grade and to identify a mentor with whom to work. In addition to the required course work, it may be desirable to take one or more elective courses. Some electives are offered once every two years and it may be desirable to take some electives during the first year in order to prepare for the qualifying exam at the end of the second year.

**B. Year 2 – Complete PMCB and CDB course requirements and prepare for qualifying exam.** Students should enroll in elective courses and journal clubs to fulfill requirements for taking the qualifying exam. The majority of the student's time and effort should be in research. A major goal for the second year is to begin to acquire the laboratory skills and conceptual framework necessary for thesis work. The student should also be spending free moments reading the scientific literature. PMCB students are required to take the qualifying exam during the summer of their second year. Immediately following passing the qualifying exam, students in consultation with their mentor should nominate a Thesis Advisory Committee which must be approved by the CDB Graduate Studies Committee. Students must meet with their Thesis Advisory Committee within 6 months of passing the Qualifying Examination.**C. Year 3 until graduation** –The student must meet with their Thesis Advisory Committee at least once a year to bring them up to date on research progress and to discuss future directions. The student must present a research seminar during the third year. About 6 months prior to anticipated thesis defense it useful to meet with the Thesis Advisory Committee to establish a consensus on items that need to be completed. It is expected that most graduate students will defend their thesis sometime in the fifth or sixth year. It is School of Medicine Graduate Council policy that students should complete all requirements for the Ph.D. within 7 years of matriculation. Students that do not complete degree requirements within this deadline may be dismissed from the graduate program. Students should also note that CDB requires that the Thesis Advisory Committee must meet to review and approve the proposed thesis research before a thesis defense can be scheduled. The chair of the Thesis Advisory Committee should send a memo to the chair of the CDB Graduate Studies Committee recording approval of the thesis project and approval for scheduling the oral thesis defense.

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### **2012 (including manuscripts submitted)**

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**Braun TP**, Orwoll B, Zhu XX, Nguyen ML, Bouxsein ML, Klein R, Marks DL *Regulation of lean mass, bone mass and exercise tolerance by the central melanocortin system*. Manuscript Submitted, *Am. J. Physiol. Endocrine and Metabolism*

**Bicocca V.T.**, Chang B.H., Muschen M., Druker B.J., J.W. Tyner. Compensatory Signaling from ROR1 and the Pre-B Cell Receptor Promote Survival of t cells (1;19) Acute Lymphoblastic Leukemia. In revision. (2011).

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**Laederich MB**, Horton WA. FGFR3 targeting strategies for achondroplasia. *Expert Reviews in Molecular Medicine* Under review 2012

**Levin TG**, Smith N, Wong, MH. CD166 maintains cell shape, migration and differentiation in the intestinal stem cell niche. Submitted

**Levin TG**, Tanyi JA, McDonald T, O'Brien P, Davies PS, Thomas CR, Wong MH. Gut-associated lymphatic cell homing after whole body and abdomen-focused irradiation injury: An *in vivo* model to study mechanisms of response to radiation enteritis. In review at *Radiation Research*.

**Maxson JE**, Enns CA, and Zhang A-S. The GPI-anchor of hemojuvelin potentiates signaling, but is not required for proteolytic processing. Submitted.

**Mo W**, Trapani JG, Nicolson T. A point mutation in *nsfa* causes auditory and vestibular defects in zebrafish, Submitted.

**McCarroll MN**, Lewis ZR, Martin B, Nechiporuk A. (2011). Graded levels of Pax2a and Pax8 regulate cell fate during sensory placode formation. Submitted.

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**NK Paulk**, L Marquez, MJ Finegold, *et al.* AAV-mediated gene repair is significantly enhanced by transient inhibition of NHEJ or the proteasome *in vivo*. (*In Review—Hum Gen Ther*).

**NK Paulk**, A Haft, K Wursthorn, *et al.* Small molecule inhibitor of FAH enzyme allows for selection of genetically resistant donor hepatocytes in wildtype settings *in vivo*. (*In Review—Nat Biotech*).

**Anne E. Powell**, Yang Wang, Yina Li, Emily J. Poulin, Anna L. Means, Mary K. Washington, James N. Higginbotham, Alwin Juchheim, Nripesh Prasad, Shawn E. Levy, Yan Guo, Yu Shyr, Bruce J. Aronow, Kevin M. Haigis, Jeffrey L. Franklin and Robert J. Coffey. "The pan-ErbB negative regulator, Lrig1, is an intestinal stem cell marker and acts as a tumor suppressor." *Cell*. In press.

Wang Z, Liu Y, Takahashi M, **Van Hook K**, Stork PJ, and Lopez CD. "The N-terminus of the ASPP2 tumor suppressor binds to Ras and enhances Ras/Raf/MEK/ERK activation to promote oncogene-induced cellular senescence. *Manuscript submitted for publication*.

**Van Hook K**, Wang Z, Chen D, Lee HJ, Zhu Z, Nold C, and Lopez CD. ΔN-ASPP2 is a novel isoform of the ASPP2 tumor suppressor and a regulator of p53 function. *Manuscript submitted for publication*.

**Van Hook K**, Wang Z, Lee HJ, Sears R, Lopez CD. The tumor suppressor ASPP2 is a novel c-Myc target gene *Manuscript submitted for publication*.

Wang Z, Liu Y, Takahashi M, **Van Hook K**, Stork PJ, and Lopez CD. "The N-terminus of the ASPP2 tumor suppressor binds to Ras and enhances Ras/Raf/MEK/ERK activation to promote oncogene-induced cellular senescence. *Manuscript submitted for publication*.

**Wang Z**, Lisowski L, Nakai H, Finegold M, Kay MA, Grompe M. AAV vectors containing rDNA homology display increased chromosomal integration and transgene persistence. (Manuscript submitted)

Lisowski L, Lau A. **Wang Z**. Zhang F. Grompe M. Kay MA. Non-random integrating rAAV-rDNA

vectors allow for stable transgene expression from rDNA loci. (Manuscript submitted)

Julien A. Sebag#, **Chao Zhang**, Rachel N. Lippert, Roger D. Cone\*, Modulation of Surface Expression of Melanocortin 4 Receptor by Melanocortin Receptor Accessory Protein 2 in Zebrafish. Submitted.

**Chao Zhang**, Paul M. Forlano, Roger D. Cone\*, AgRP and POMC Neurons Are Hypophysiotropic and Coordinately Regulate Multiple Endocrine Axes in a Teleost. *Cell Metabolism*, 2012, doi:10.1016/j.cmet.2011.12.014

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**EXTRAMURAL FELLOWSHIPS/TRAINEE AWARDS TO CDB STUDENTS**

- **Bornstein, Sophia**

2010 Radiological Society of North America Research Med. Student Grant

2010 Rubinstein Radiation Research Scholar

2008 Keystone Symposia NCI/NIAMS Scholarship

- **Clemens Grisham, Rachel**

2010-2011 Ruth L. Kirschstein National Research Service Award (NRSA)

- **Hoot, Kristina**

2007 Albert M. Kligman Fellowship, Society of Investigative Dermatology, Competitive travel award for young scientists to present data at the annual meeting for the Society of Investigative Dermatology.

- **Itakura, Asako**

2008 Young Investigator Award, Japan Society for Bioscience, Biotechnology and Agrochemistry, Kanto meeting

- **Kamimae-Lanning, Ashley**

2003-2010 Bill & Melinda Gates Millennium Scholarship

- **Kapeli, Katannya**

2008, 2010 SACNAS National Conference Travel Award

- **Laederich, Melanie**

2010 PhRMA Pre Doctoral Fellowship

2011 PhRMA Pre Doctoral Fellowship

- **Levin, Trevor**

2006-2007 American Gastroenterological Association, Research Fellowship Grant: Blood cell fusion in the intestine and the interaction between gut associated lymphatics and the intestinal epithelia.

- **Liu, Chang**

2008 Predoctoral Travel Award, the 48th Annual Meeting of American Society for Cell Biology (ASCB)

- **Maxson, Julia**

2010 American Heart Association Predoctoral Fellowship

- **Paulk, Nicole**

2007-2012 NIH F31 NRSA Ruth Kirschstein Predoctoral Fellowship \$330,000

2007-2010 USA Funds Access to Education Academic Scholarship \$12,000

2009-2010 Leslie S. Parker Memorial Scholarship \$1,000

2008-2009 Mary Horstkotte Memorial Scholarship \$2,000

2007-2008 Mildred and CK Dart Memorial Scholarship \$2,000

- **Tarlow, Branden**

2012 – 2014 Ruth L. Kirschstein National Research Service Award (NRSA), NIH/NIDDK F30 support

- **White, Ruth**

2009 AACR Bristol Meyer Squibb scholar in training award: American Association for Cancer Research annual meeting, Denver CO

## COMPETITIVE INTRAMURAL FELLOWSHIPS/AWARDS TO CDB STUDENTS

- **Bicocca, Vincent**

2010: Tartar Trust Fellow, Oregon Health & Science University. This fellowship provides support for research endeavors and research career development

- **Bornstein, Sophia**

2007 NIH Pre-doctoral Training Grant, OHSU Dermatology Department

2010 Tartar Trust Fellowship, OHSU School of Medicine

- **Coate, Thomas**

2008 Training Program in Embryonic Development Grant Recipient

- **Donley, Nathan**

2009 Oregon Health and Science University T32 Pre Doctoral Molecular Hematology Training Grant # 5 T32 HL0078120112

2008 Oregon Health and Science University T32 Pre Doctoral Program in the Molecular and Cellular Biosciences Training Grant # 5  
T32 GM071338

2010 American Foundation for Aging Research Scholarship. \$1,000 research

- **Hoot, Kristina**

2006-2008 Appointment to T32 Pediatrics Training Grant, Oregon Health & Science University, Selection to the T32 training grant which funded my graduate tuition, student fees, and provided stipend support.

- **Kamimae-Lanning, Ashley**

2010-NRSA T32 Molecular Hematology Training Grant Fellowship

2011 Tartar Trust Fellowship

2011 Fanconi Anemia Research Fund Speaker Travel Award

- **Kapeli, Katannya**

2010 Tartar Trust Fellowship

2009-2011 Technology in Entrepreneurship Fellowship

- **Laederich, Melanie**

2007 Tartar Trust Fellowship

- **Levin, Trevor**

2008-2011 Training in the Molecular Basis of Skin/Mucosa Pathobiology, NIH T32 CA106195

- **Liu, Chang**

2008 Best Poster Award, Program in Molecular and Cellular Biosciences, OHSU

2009 Vertex Scholar, Vertex Pharmaceuticals (Cambridge, MA) in collaboration with OHSU

- **Macleod, Alison**

2011 - 2012 OHSU hematology training grant

- **Maxson, Julia**

2007 Training Program in Embryonic Development Grant Recipient

2008 Vertex Scholarship

2011 Program in Molecular Hematology Postdoctoral Training Grant Recipient

2009 Training Program in Embryonic Development Grant Recipient

- **Mimoto, Mizuho**

2007 Tartar Trust Fellowship, OHSU

2007-2010 Developmental Biology Training Grant Trainee

2009 Tartar Trust Fellowship, OHSU

- **Mo, Weike**

2008 Tartar Fellowship, Oregon Health & Science University

- **Paulk, Nicole**

2010-2011 Oregon Graduate Scholarship Fund \$2,000

- **Powell, Anne**

2009 Best Oral Presentation - 26th Annual Student Research Forum, OHSU

- **Tarlow, Branden**

2009 - 2<sup>nd</sup> Place Oral Presentation, OHSU Student Research Forum, Public Health Section

2008-2009- OHSU Medical Scientist Training Program , NIH T32 support

- **Van Hook, Katy**

2010 graduate student stipend from the Oregon Health and Science University Cancer Biology Department. Funded by the Knight Cancer Institute

2009 Tartar Trust Fellowship

2008-2010 Traineeship, Oregon Health & Science University Medical Hematology and Oncology NIH/NHLBI T-32 training grant.

2007-2008 Program in Molecular and Cellular Biosciences training grant.

- **Worthen, Christal**

2010-2011 OHSU Hematology Training Grant

## **OTHER AWARDS TO CDB STUDENTS**

- **Bahney, Chelsea**

2010 Best Talk Award (2nd Place) OHSU Student Research Forum

2009 Best Talk Award OHSU Student Research Forum

2009-2011 AAAS/Science Program for Excellence in Science Award



2008 Best Poster Award OHSU Developmental Biology Symposium

2008 Best Poster Award OHSU Student Research Forum

- **Bicocca, Vincent**

2009: First place. Oral presentation; Drug discovery. Oregon Health & Science University. Student Research Forum.

- **Bornstein, Sophia**

2008 1<sup>st</sup> Place, Poster Presentation, 2<sup>nd</sup> Symposium of SCBA-Oregon

2010 Outstanding Medical Student in Radiation Medicine

- **Braun, Theodore**

2007 OHSU School of Medicine Award for Academic Excellence

2011 Young Investigators Award, International Cachexia Meeting for the Abstract/Presentation entitled: “Central Nervous System

Control of Inflammation Induced Muscle Catabolism”, Milan, Italy. Awarded to the top abstract presented by a junior investigator

- **Coate, Thomas**

2007 Outstanding Oral Presentation Award, Student Research Forum, OHSU

2008 Outstanding Oral Presentation Award (2<sup>nd</sup> place), Society for Developmental Biology Regional Meeting, Friday Harbor, WA.

- **Hoot, Kristina**

2010 American College of Physician, Oregon Chapter, Poster Presentation Finalist, American College of Physicians, Oregon Health & Science University, Top 10 posters at the 2010 Oregon Chapter ACP competition.

2010 Outstanding Medical Student in Radiation Medicine, OHSU Department of Radiation Medicine, OHSU, Top medical student going into Radiation Oncology.

- **Itakura, Asako**

2007 Member of the Japanese delegation, 2007 Asian Science Camp, Taiwan, August

- **Kamimae-Lanning, Ashley**

2011 American Society of Hematology Abstract Achievement Award

- **Laederich, Melanie**

2007 SF Predoctoral Award, Honorable Mention

- **Liu, Chang**

2007 2nd place, the 2nd Symposium of the Society of Chinese Bioscientists in America, Oregon Chapter

- **Macleod, Alison**

2011 OHSU Gary Thomas Award

- **Maxson, Julia**

2009 PMCB best poster presentation

2009 OHSU Student Research Forum best oral presentation

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- **Mimoto, Mizuho**

2009 OHSU Heart Research Center Trainee of the Year Honorable Mention

- **Paulk, Nicole**

2009 Travel award from NW Genome Engineering Consortium \$500

2011 Travel award from American Society for Gene & Cell Therapy \$500

2008 Travel award from American Society for Gene Therapy \$500

- **Powell, Anne**

2010 Best Poster- Southeast Stem Cell Consortium, Vanderbilt University Medical Center

2011 Best Poster- ASCI/AAP 2011 Joint Meeting, Chicago, IL

2011 Poster of Distinction- FASEB

2011 Travel Fellowship- ASCI/AAP 2011 Joint Meeting, Chicago, IL

2010 Postdoctoral Recruitment Award- Vanderbilt University Medical Center

2009 Best Oral Presentation by a Graduate Student - Society for Developmental Biology

2009 Travel Fellowship- Keystone Symposia on Stem Cell Niche Interactions, Whistler, BC, Canada

2009 Best Oral Presentation by a Graduate Student - Society for Developmental Biology Northwest Regional Meeting, Friday Harbor, Washington

- **Wang, Zhongya**

2009 Travel Grant Award, American Society of Gene Therapy, 12<sup>th</sup> Annual Meeting

2008 Excellence in Research Award, American Society of Gene Therapy, 11<sup>th</sup> Annual Meeting

2008 Travel Grant Award, American Society of Gene Therapy, 11<sup>th</sup> Annual Meeting

2007 Travel Grant Award, American Society of Gene Therapy, 10<sup>th</sup> Annual Meeting

2008 Outstanding Master Thesis Award, OHSU

- **White, Ruth**

2011 Society for Investigative Dermatology Eugene M. Farber Travel Award for Young Investigators: Montagna Symposium on the Biology of Skin, Skamania, WA

2008 Distinguished Poster Award: 7<sup>th</sup> International conference on Head and Neck Cancer, San Francisco CA

- **Xie, Liangqi**

2011 9<sup>th</sup> ISSCR(International Society for Stem Cell Research) Travel Award recipient, Toronto, Canada

- **Zhang, Chao**

2012 Jackie Corbin Travel Award, Cold Spring Harbor Asia Conference. Vanderbilt University

**2008 (September and later)****Thomas Coate, Ph.D.**

Postdoctoral Fellow, Matthew Kelley Lab, National Institute of Health, NIDCD,

**Thesis Title: The role of Ephrin-Eph interactions during ENS Formation in Manduca Sexta**

**Daniel Sherbenou, Ph.D.**

Returned to medical school, Oregon Health & Science University

Thesis Title: BCR-ABL mutations in chronic myeloid leukemia patients treated with imatinib

**Jeff Chen, Ph.D.**

Returned to medical school, Oregon Health & Science University

Thesis Title: Midkine and Pleiotrophin In Drosophila

**2009****Sophia Bornstein, Ph.D.**

Returned to medical school, Oregon Health & Science University

Thesis Title: Role of Smad4 Loss in Head and Neck Squamous Cell Carcinoma

**Kristina Hoot, Ph.D.**

Returned to medical school, Oregon Health & Science University

Thesis Title: The Role of Keratinocyte-Specific Smad2 Loss in Skin Squamous Cell Carcinomas

**Philip Owens, Ph.D.**

Postdoctoral Fellow, Hal Moses Lab, Vanderbilt University

Thesis Title: Determining the function of Smad4 during skin development and disease

**2010****Anne Powell, Ph.D.**

Postdoctoral Fellow, Robert Coffey Lab, Vanderbilt University

Thesis Title: Cellular Fusion in the Mouse Intestine

**Nicole Vasilevsky, Ph.D.**

Postdoctoral Fellow, Juhua Chen Lab, Legacy Health Systems

Thesis Title: The role of Mad4, Mnt and c-Myc proteins in OX40 stimulated T cells

**2011****Chang Liu, Ph.D.**

Postdoctoral Fellow and Clinical Pathology Resident, Washington University, St Louis

Thesis Title: The Spatial Control of Rap1 Via Epac Proteins

**Mizuho Mimoto, Ph.D.**

Returned to medical school, Oregon Health & Science University

Seminar Title: Regulation of Primitive Erythropoiesis in *Xenopus laevis*

**Chelsea Bahney, Ph.D.**

Postdoctoral Fellow, Ralph Marcucio Lab, University of California San Francisco

Thesis Title: Cartilage Engineering: Designing and Improved System for Effecting Repair of Articular Defects

**Meghan Lindauer, Ph.D.**

Postdoctoral Fellow, Sylvia Cremer Lab, The Institute of Science & Technology Austria

Thesis Title: Inflammatory signaling triggered by ricin toxin involves IL-1 beta and the NALP3 inflammasome

**Julia Maxson, Ph.D.**

Postdoctoral Fellow, Brian Druker lab, Knight Cancer Center, Oregon Health & Science University

Thesis Title: Processing and trafficking of the iron regulatory protein, hemojuvelin

**Yun Xin Lim, M.S.**

Research Assistant II, interviews incomplete

Thesis Title: Cellular and mutagenic effects of formaldehyde exposure

**2012****Ruth White, Ph.D.**

Returned to medical school, Oregon Health & Science University

Thesis Title: MicroRNA Regulation of Tumor Initiating Cells, Metastasis and Chemoresistance

**Vincent Bicocca, Ph.D.**

Postdoctoral Fellow, Brian Druker lab, Knight Cancer Center, Oregon Health & Science University

Thesis Title: ROR1 Expression and Function in B Cell Malignancies

**Katannya Kapeli, Ph.D.**

Postdoctoral Fellow, Gene Yeo lab, University of California San Diego

Thesis Title: Differential regulation of N-Nyc and c-Myc protein synthesis and degradation by the Ras/MAPK pathway

**Melanie Laederich, Ph.D.**

Postdoctoral Fellow, interviews incomplete

Thesis Title: Defining the role of Hsp90 in the stability, function and pathology of FGFR3

**Trevor Levin, Ph.D.**

Postdoctoral Fellow, Joe Gray lab, Oregon Health & Science University

Thesis Title: Role of the cell adhesion molecule, DC166, in homeostatic maintenance and regeneration of the intestinal stem cell niche

**Chao Zhang, Ph.D.** (Graduation pending)

Postdoctoral Fellow, Roger Cone lab, Vanderbilt University

Thesis Title: Elucidation of the Function of Agouti Peptides in Zebrafish

**Nicole Paulk, Ph.D.** (graduation pending)

Postdoctoral Fellow, Mark Kay lab, Stanford University

Thesis Title: Novel Strategies to Improve Viral Gene Targeting and Therapeutic Liver Repopulation *In Vivo*

**Theodore Braun, Ph.D.** (graduation pending)

Returned to medical school, Oregon Health & Science University

Thesis Title: Central Nervous System Regulation of Muscle Atrophy