

“Information of Cell Signaling” :Course design and highlights

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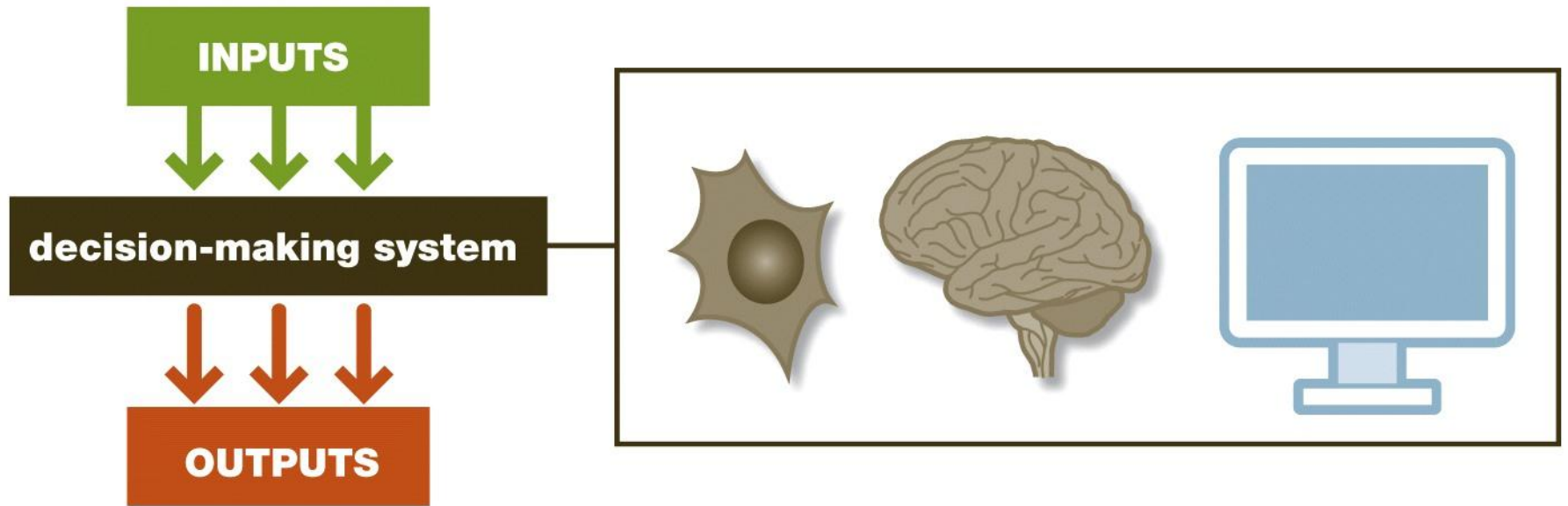
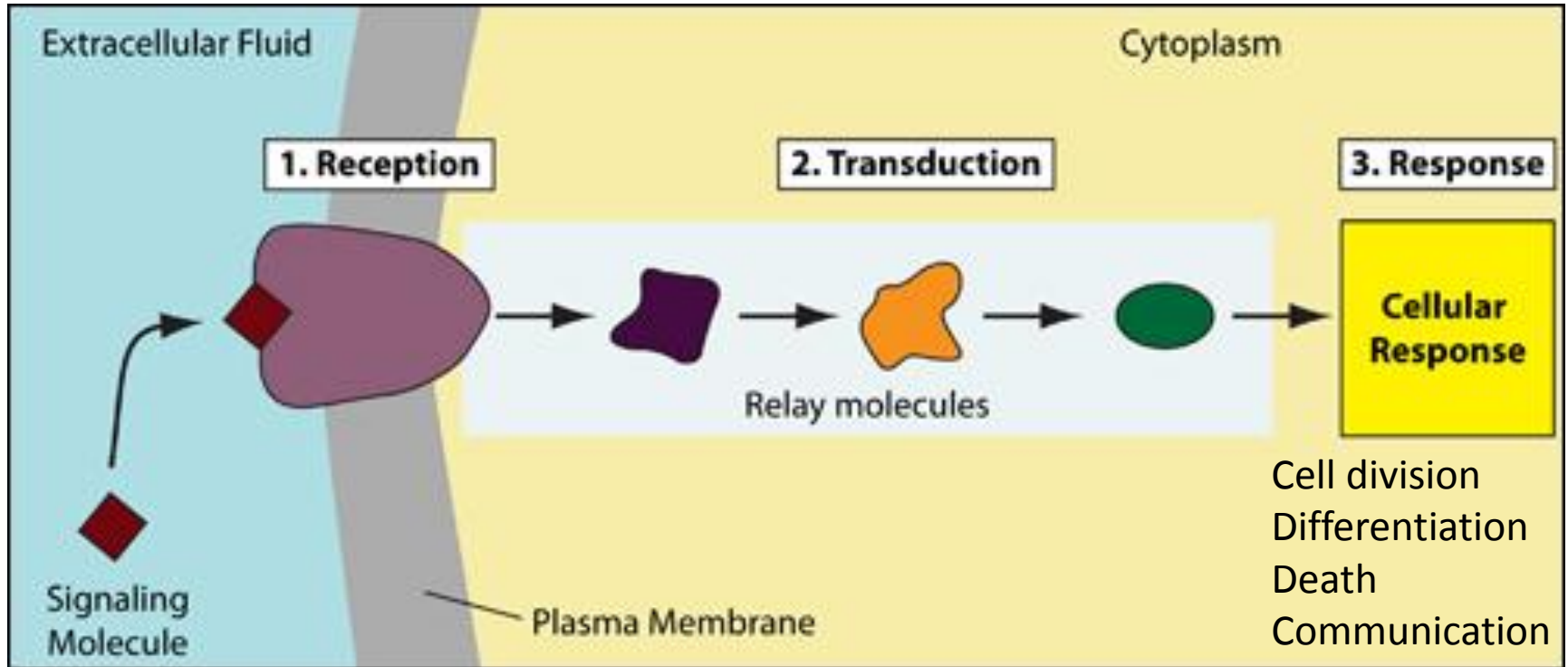


Figure 1.1a Cell Signaling (© Garland Science 2015)

Cell Signaling - Concept



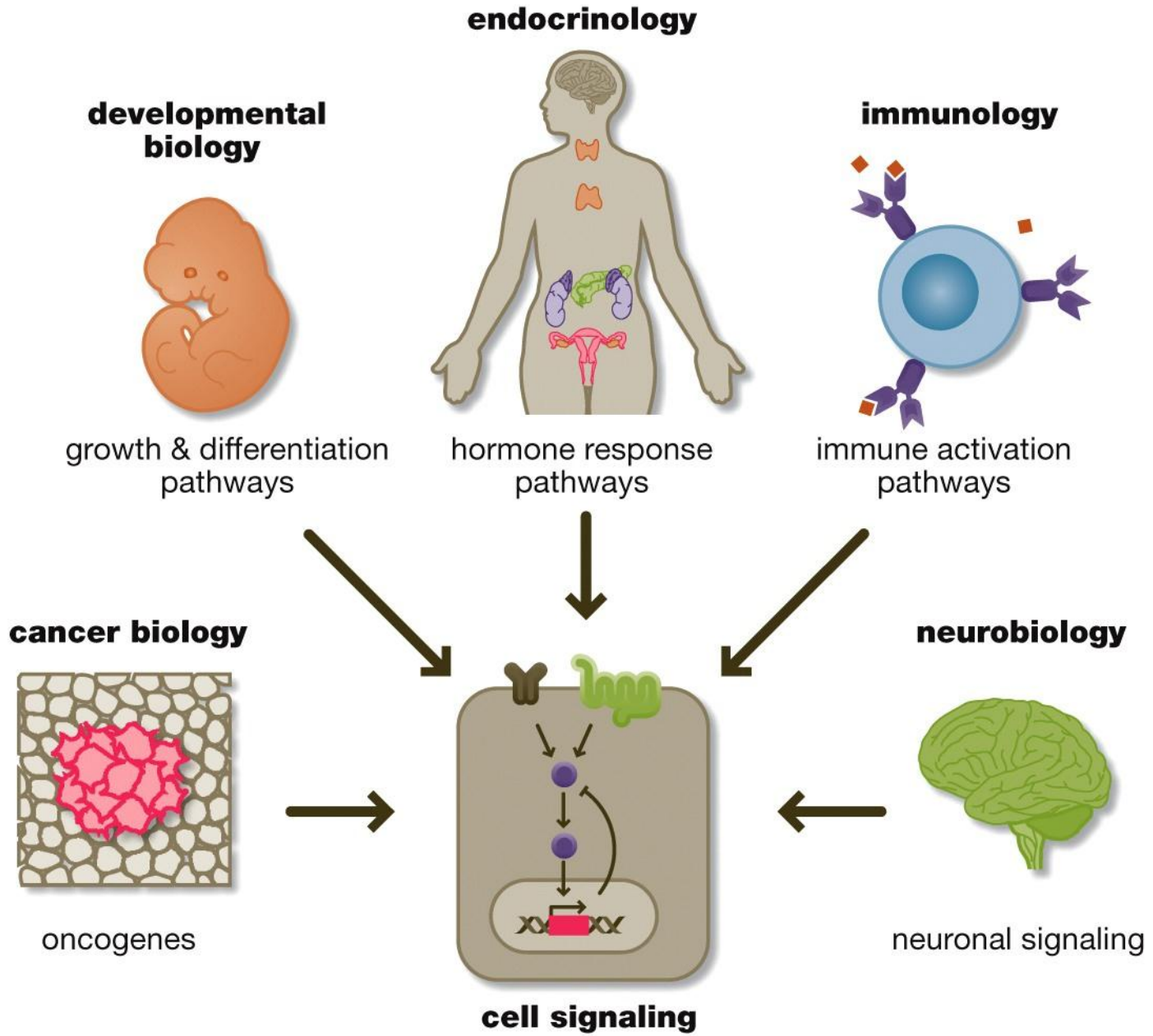


Figure 1.3 Cell Signaling (© Garland Science 2015)

Information

- Pathways & Networks
 - Spatial-temporal
- Responses
 - Positive and negative
 - Non-linear
- Cell to Cell communication
 - Local
 - Long range

Course Objectives..

- Create interdisciplinary learning opportunities for undergraduate students at Villanova Univ.
 - Biology
 - Biochemistry
 - Computing Sciences

Course Objectives

- Develop skills in Undergraduate students to communicate and collaborate across disciplines
- Generate future interdisciplinary scientists and work force – hopefully!

Unique features

- Pair biology and CSc Undergraduates
- Wet-laboratory sessions
 - Understand the source of data
 - Generate data
- Dry- laboratory sessions (Computational)
 - Learn analysis techniques
 - Analyze information

Course Structure & Topics (4 cr)

- **Introductory Lectures** (3)
 - Biology
 - Computing Sciences
 - Science of Information
- **Four learning modules** (2 weeks each)
 - Cell division
 - Cell differentiation
 - Cell death
 - Cell-cell Communication
- **Independent project** (3 weeks)
 - Capstone experience
 - Systems-driven
 - Modeling-based

Structure of each module

- Biological concept (flipped class room)
 - Wet-lab – generate data
 - Laboratory notebook
 - Problem set and worksheet

- Computations concept
 - PetriNet
 - CompuCell3D

Assessments & Evaluations

- **Each Module**
 - Note book for wet-lab data
 - Problem sets and Worksheets
 - Class participation
- **Final project**
 - Final Presentation
 - CSc present biological content and Bio present computational content
 - Project write-up
 - (individual)

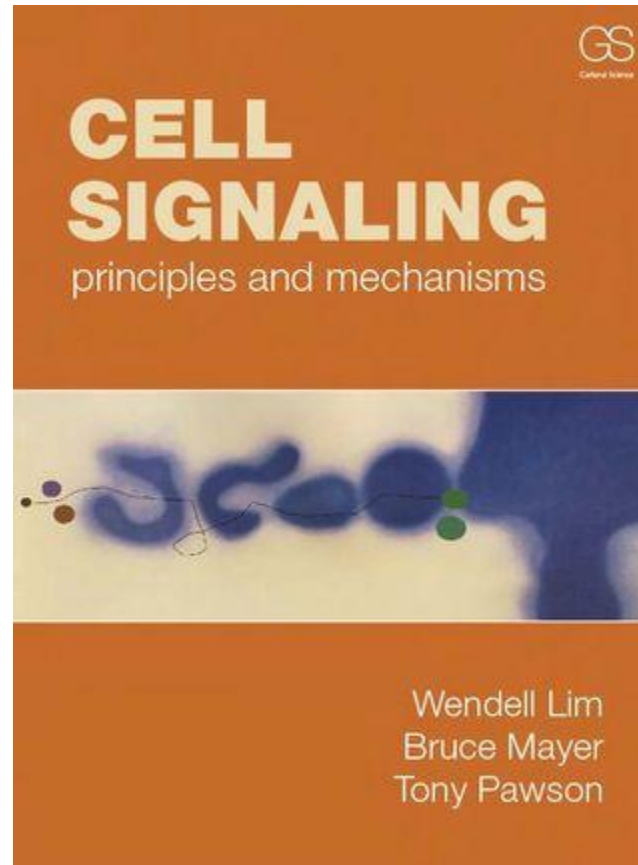
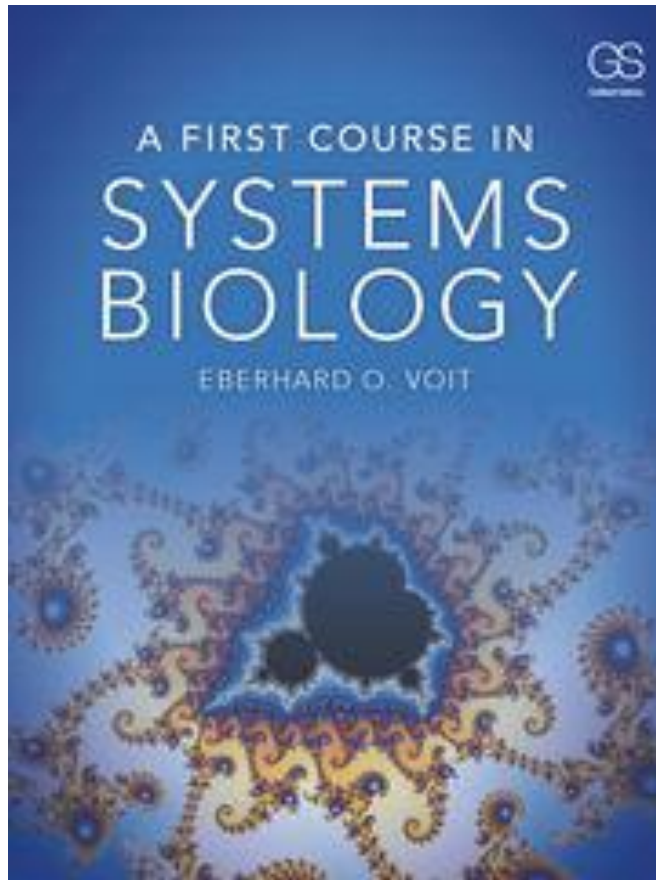
Assessments & Evaluations..

- student survey before and after-the course
 - involve OPTIR at VU and SOI at Purdue
 - Communication with off-site, consider change in pre-requisites that were set up

Instructors:

- Anil Bamezai
 - Biology Dept., VU- expertise in cell signaling
- Vijay Gehlot
 - Computing Sciences, VU – expertise in PetriNet tools
- Karen Watanabe
 - Oregon Health & Science University – expertise in CompuCell3D Software
- Deepak Kumar
 - Brynmar College –expertise in SOI

Text books



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