

# Big Picture

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What are common elements?

Curriculum

Audience

Institutional culture

Philosophy

Goals

## Discussion Topics

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1. What fields/courses are required?  
clinical experience  
(patho)physiology
2. What is course format?  
Didactic lectures, cases, small groups,  
involvement with a patient...
3. How are courses evaluated?
4. What are some of the challenges?  
Time  
Money

	TYPE OF PROGRAM	POOL OF STUDENTS	HUMAN PHYSIOLOGY		PATHO-PHYSIOLOGY		BIOSTATISTICS		PHARMACOLOGY		MEDICAL GENETICS		IMMUNOLOGY		TRANSLATIONAL OR MOLECULAR MEDICINE		HISTOLOGY/ HISTOPATHOLOGY		CLINICAL EXPERIENCE		CLINICAL CO-MENTORSHIP		
			R	E	R	E	R	E	R	E	R	E	R	E	R	E	R	E	R	E	R	E	
BAYLOR	freestanding Ph.D. program		x		x		x			x		x			x			x		x		x	
CASE	freestanding Ph.D. program		x		x		x		x		x		x		x				x		x		
HARVARD	Enrichment Program/ Certificate	All life sciences Ph.D. students	x		x			x	x			x			x			x		x			x
MIT	Certificate	All science and engineering departments	x		x			x		x			x		x			x		x			x
RICE	Ph.D. track	Bioengineering students																					
STANFORD	Masters	All science and engineering Ph.D. program	x		x			x		x			x		x				x				x
UAB	Certificate	Interdisciplinary graduate training programs	x		x			x		x			x		x								
UC DAVIS	Designated Emphasis/ Masters	Biomedically-relevant biological science graduate program	x		x				x			x			x								
UCSD	High-impact elective medical education	Biomedical sciences, molecular pathology, neurosciences, bioengineering, and computational biology		x		x			x				x			x			x				
UNC	Certificate	Biological and biomedical umbrella	x		x			x		x			x			x			x				x
UPENN	Certificate	Umbrella biology program	x		x				x					x			x						
UW	Certificate	Basic science, bioengineering, and interdisciplinary	x			x				x				x			x						
YALE	Certificate	Umbrella biology program	x		x											x					x		

R= Required

E= Elective

# Educational Goals or Core Knowledge

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1. Human Physiology: Understand the mechanical, physical, and biochemical functions of humans in good health, their organs, and the cells of which they are composed.
2. Pathophysiology: Study the disturbance of normal mechanical, physical, and biochemical functions, either caused by a disease, or resulting from a disease or abnormal. syndrome, or condition that may not qualify to be called a disease.
3. Biostatistics: Introduce statistical concepts and methods with an emphasis on applications in medicine.
4. Pharmacology: Introduce the study of drug action and modern approaches to drug discovery.
5. Medical Genetics: Introduce the application of genetics to medical care.
6. Immunology: Introduce basic concepts in immunology as it relates to disease.
7. Translational or Molecular Medicine course: introduce students to the ways in which biomedical research can provide new insights into clinical medicine and, conversely, how knowledge of clinical disease impacts scientific discovery.
8. Histology or Histopathology: microscopic examination of tissue in order to study the manifestations of disease

# Other Important Curricular Elements

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## 1. University of Washington

- Goal: Help students identify important problems and think about how to solve them Course: Challenges in Molecular Medicine
- Format: An hour-long seminar by an eminent researcher, open to the entire Seattle research community and typically attended by 80-100 people, is followed by lunch and detailed discussion with the speaker for enrolled graduate students. Students like learning about unsolved problems, and enjoy the informal interactions with the speaker; and faculty like the interdisciplinary and in depth coverage of a single topic, which differentiates this from departmental seminars.

## Other Important Curricular Elements

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2. UC DAVIS Goal: Have translational aspects run throughout program.
3. CASE Objectives:
  - Basic science is taught in the context of human health and disease.
  - Clinical relevance is integrated throughout the core curriculum.
  - Additional coursework to build skills for performing translational research is required.
  - The educational approach incorporates student-centered, case-based learning in concert with traditional approaches.
  - A central goal is to empower the students to take responsibility for their own learning.