

MMI Clinical and Translational Research

Module Title:	Case studies in drug discovery and development
Module Code:	MMICTRSP-XXX
Coordinator:	Professor David Brayden (UCD)
Credits (ECTS):	2.5
Module Seats	50
<p>Target Group: Postgraduate researchers in science, medicine and healthcare with specific interest in the pharmaceutical drug discovery and development process</p>	
<p>Indicative Module Description: This module begins with an introductory overview of the concepts involved in the traditional drug discovery and development process in the pharmaceutical industry and goes on to discuss why it is under pressure. We then provide selected case study examples of both small molecule and biotech molecule development from discovery to market, which are delivered by appropriate experts from academia and industry. The final part is a review of what these discoveries teach in terms of informing about the process. One of the main points is that such discoveries originate from sometimes the most unusual beginnings and that none of the stories followed the same narrative. A common feature is while luck played a role, observant and prepared scientists were needed to move a project forward. We will also see that large pharma are essential for the major development, clinical trial and regulatory work, involved irrespective of the origin of the molecule.</p> <p>Session 1: Introduction to drug discovery and development: Concepts and analysis (Prof David Brayden, UCD) ✓</p> <p>Session 2: Rational drug discovery: Sir James's Black's discovery of propranolol and cimetidine (Prof. Alan Baird, UCD) ✓</p> <p>Session 3: Aspirin: pharmacology, development and new indications (Dr.Orina Belton, UCD ✓)</p> <p>Session 4: Tysabri®: origins of a blockbuster for MS</p> <p>Session 5: Denosumab®, a new biologic for treatment of osteoporosis (Dr. Will Dere, Amgen USA) ✓</p> <p>Session 6: Kalydeco®: An orphan drug designed for a percentage of cystic fibrosis patients (Prof. David Brayden, UCD). ✓</p> <p>Session 7: Bottlenecks in the development of drugs for neurodegeneration (Prof. Orla Hardiman ✓, Dr. Julie Kelly, TCD ✓)</p> <p>Session 8: Personalised medicines: tailored cancer therapies and learnings from the discovery of Herceptin® (Prof. Liam Gallagher, UCD)✓)</p> <p>Session 9: Insulin: discovery, delivery, and devices (Prof. Sally-Ann Cryan, RCSI) ✓</p> <p>Session 10: Gene therapies: from failure to success (Prof Caitriona O'Driscoll, UCC ✓; Prof Jane Farrar, TCD)</p>	

Indicative Learning Outcomes:	
<i>On successful completion of this module students should be able to:</i>	
<ol style="list-style-type: none"> 1. Understand the drug development process following initial molecule discovery 2. Be able to describe the different manufacturing issues for small molecules and biologics 3. Argue as to why the days of blockbusters are over and that drugs for cohorts of patients is the future 4. Understand each phase of clinical development and causes of attrition 5. Be able to discuss how academia is contributing to major drug discoveries 	
Learning Activities:	Indicative Hours
Interactive online learning	12
Assessments	6
Reading	30
Workshop	2
Assessment:	
MCQs during and after each online session	
Total Hours	50
Delivery and Schedule	Combination of e-learning materials via Blackboard and a workshop

Coordinator: Professor David Brayden

Coordinates science and veterinary pharmacology-based undergraduate modules in UCD and is also a Conway Fellow at UCD. His qualifications are B. Sc. Hons. (1984), M.Sc. (1985) in Pharmacology at UCD; Ph.D. (1989) in Pharmacology at the University of Cambridge, UK. Prof. Brayden is the Director of the SFI Irish Drug Delivery Research Network Cluster, encompassing the three Schools of Pharmacy and four industry partners. Other funding is from the IRC, Department of Agriculture and Novo-Nordisk. He is the author or co-author of over 150 research publications and 7 patents. Prof. Brayden serves on the Editorial Advisory Boards of *Drug Discovery Today* and *Advanced Drug Delivery Reviews* and is an Associate Editor of *Therapeutic Delivery*. Contact: David.Brayden@ucd.ie

Text

Hill, RG & Rang, HP (2013) *Drug Discovery and Development: Technology in Transition*, 2nd Ed. Churchill Livingstone and Elsevier Health. www.studentconsult.com
Available as an e-book.