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開課班級：博觀賞魚專班一A

授課老師：歐卡爾

學分數：3

課程大綱：

Course provides an overview of the immune system in fish with emphasis on commercial aquaculture species. The student will learn about the different organs, cells and molecules and how these work and collaborate, and how cells and functions are regulated and stimulated. The students will develop knowledge about fish immune response during vaccination and immune stimulants in shrimp with emphasis on the immune prophylaxis for aquaculture species.

outline:

1. History of Fish immunology 2. Immune organs of fish 3. Inflammation 4. Innate immunity of fish 5. Key cells involved in fish innate immunity – leucocytes 6. Innate immune sensing in fish: Cell based 7. Humoral-based immune sensing in fish 8. Fish Cytokines and chemokines 9. Major Histocompatibility Complex (MHC) in fish 10. Antigen presentation 11. T-cell response in fish 12. Immunoglobulins of fish 13. B-cell response in fish 14. Hemocytes in shellfish and tissues of their immune system 15. Pathogen recognition receptors (PRR) of shellfish 16. ProPO in shellfish 17. Coagulation in shellfish 18. Anti-viral mechanisms in shellfish

教學型態：

課堂教學

成績考核方式：

平時成績:20%
期中考:30%
期末考:40%
其它:10 % for attendance%

本科目教學目標：

The aim of this course is to develop updated knowledge among students about the fish immune system, its interaction with fish pathogens and its responses to stimulation and vaccines. Certain crustaceans will also be included. This knowledge will be developed through lectures, group discussion, written assignment submissions, student presentations and through laboratory courses.

參考書目：

1. Fish Defenses, Vol I: Immunology. Edited by G. Zacccone et al., (2017). CRC Press, Taylor & Francis Group 2. Fish vaccination. Edited by R. Gudding, A. Lillehaug and O. Evensen (2014). John Wiley & Sons, Ltd. , 9600 Garsington Road, Oxford, OX4 2DQ, UK. ISBN 978-0-470- 67455-0. 3. Immunobiology. Kenneth Murphy and Casey Weaver. 9th Edition, (2016). Garland Science Publishing. Book is also known as Janeway ' s Immunobiology 4. Essential Immunology. P.J. Delves, S.J. Martin, D.R. Burton, Roitt, I.M. (eds) (2011). Wiley Blackwell 12th edition. 5. Abul K. Abbas & Andrew H. Lichtman, S. Pillai (2017). Cellular and Molecular Immunology. 9th edition. Elsevier Science/Saunders, Philadelphia.



課程進度表：

週次	起訖月日	授課單元(內容)	備註
第1週	9.09~9.16	History of Fish immunology, Fish Immune system	8日正式上課。8~12日課程加退選，轉學(系)生、復學生及延修生選課，雙主修、輔系申請，12日申辦抵免學分截止日
第2週	9.16~9.23	Mid-autumn festival- Holiday	
第3週	9.23~9.30	Invited guest speaker	28日(日)孔子誕辰紀念日/教師節(放假),29日(一)補假
第4週	9.30~10.07	Due to typhoon no class was held	29日成績優異提前畢業者提出申請截止日
第5週	10.07~10.14	Cells of immune system	6日(一)中秋節(放假)，10日(五)國慶日(放假)
第6週	10.14~10.21	Antigen-presenting and processing	14日學生宿舍安全輔導暨複合式防災疏散演練。18日多益測驗
第7週	10.21~10.28	Innate immune sensing in fish: Cell based	24日(五)補假，25日(六)光復暨古寧頭大捷日(放假)。
第8週	10.28~11.04	Humoral-based immune sensing in fish	30日校課程委員會
第9週	11.04~11.11	Fish Cytokines and chemokines	3~9日期中考試
第10週	11.11~11.18	Major Histocompatibility Complex (MHC) in fish	13日教務會議,16日教師期中成績上網登錄截止日
第11週	11.18~11.25	Toll like receptors in fish	
第12週	11.25~12.02	T-cell response in fish	24~28體育運動週。24日校園路跑。27日運動大會夜間開幕，28日運動大會活動，29日101週年校慶活動日，照常上班
第13週	12.02~12.09	Immunoglobulins of fish	
第14週	12.09~12.16	B-cell response in fish	12日申請停修課程截止日
第15週	12.16~12.23	Hemocytes in shellfish and tissues of their immune system	
第16週	12.23~12.30	Pathogen recognition receptors (PRR) of shellfish	22日校務會議。25日行憲紀念日(放假)
第17週	12.30~1.06	ProPO in shellfish	1日(四)開國紀念日(放假)
第18週	1.06~1.13	Coagulation in shellfish and;Anti-viral mechanisms in shellfish	5~11日期末考試，10~11日學生退宿