

*MMPH6211 Molecular epidemiology: microbial genetics and evolution*

**Coordinator: Dr H. Zhu & Dr T.Y. Lam**

**Course Description:**

The genomes of pathogenic microorganisms determine their infection and transmission in hosts. Emergence and re-emergence of infectious diseases are usually associated with the evolution of these pathogens in response to the host defense and environmental challenges. This course introduces the genomic and evolutionary biology of pathogens causing human infections, and the implications to the public health policies for disease control and management, such as regarding to vaccine strain selection and drug administration. Modern research methods for studying pathogen genome and evolution to understand their transmission and epidemiology, are also introduced, with demonstration using real examples from recent epidemics.

**Prerequisite:** None

**Term 3 (Friday)**

**Contact person: Ms Zoe Song**

Date	Time	Lecture Topic	Lecturer	Venue
13 May 2022	6:30 – 9:30 pm	1. Molecular epidemiology: basic principle and approaches	Dr H. Zhu/ Dr T.Y. Lam	Online
20 May 2022	6:30 – 9:30 pm	2. Genetics, evolution and pathogenesis of virus and prion	Dr H. Zhu/ Dr T.Y. Lam	Online
27 May 2022	6:30 – 9:30 pm	3. Genetics, evolution and pathogenesis of prokaryotic and eukaryotic pathogens	Dr H. Zhu/ Dr T.Y. Lam	Online
10 Jun 2022	6:30 – 9:30 pm	4. Mechanisms of microorganism evolution	Dr H. Zhu/ Dr T.Y. Lam	Online
17 Jun 2022	6:30 – 9:30 pm	5. Arms race between human and pathogens	Dr H. Zhu/ Dr T.Y. Lam	Online
24 Jun 2022	6:30 – 9:30 pm	6. Modern molecular biological methods to study pathogens and their genomes	Dr H. Zhu/ Dr T.Y. Lam	Online
08 July 2022	6:30 – 9:30 pm	7. Evolutionary analysis of pathogens: Basic principles and applications (I)	Dr H. Zhu/ Dr T.Y. Lam	Online
15 July 2022	6:30 – 9:30 pm	8. Evolutionary analysis of pathogens: Basic principles and applications (II)	Dr H. Zhu/ Dr T.Y. Lam	Online
22 July 2022	6:30 – 9:30 pm	9. Real case study (I) with hand-on	Dr H. Zhu/ Dr T.Y. Lam	Online
29 July 2022	6:30 – 9:30 pm	10. Real case study (II) with hand-on	Dr H. Zhu/ Dr T.Y. Lam	Online
05 Aug 2022	6:30 – 8:30 pm	Examination	Dr H. Zhu/ Dr T.Y. Lam	Online

**Course Assessment:**

Written task or analytical exercises: 50%

Tutorial: 20%

Exam: 30%

**Recommended Textbooks:**

1. Morand S, et al. New frontiers of molecular epidemiology of infectious diseases. Springer, 2012.
2. Foxman B. Molecular tools and infectious disease epidemiology. Amsterdam Elsevier, 2012.
3. Richard Goering, Hazel Dockrell BA, Mark Zuckerman, Ivan Roitt, Peter L. Chiodini. Mims' Medical Microbiology (5th Edition). 2013. Elsevier.
4. Edward C. Holmes. The Evolution and Emergence of RNA Viruses. 2009. Oxford University Press.
5. Valencia C. Next generation sequencing technologies in medical genetics. 2013. New York: Springer.
6. Kwon Y, Ricke S. High-throughput next generation sequencing methods and applications. 2011. New York: Humana Press.
7. Barry G. Hall. Phylogenetic Trees Made Easy: A How-To-Manual (4th Edition). 2011. Sinauer Associates, Inc.

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