

Guidelines and Assignments (Dec 1, 2020)

PBL Topic: “Epigenetic regulation in cancer--a focus on DNA methylation and gene silencing”

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Submit powerpoint slides (each presentation should be labeled by the names of the contributors, **10-12 slides** suggested for each presentation) for no more than 10 min presentation time to Moodle no later than 1 PM on Monday (Nov. 30 逾時扣分).請醫技班代負責收齊所有組的報告檔(統一於一張 CD)再一起交給蔣老師.

Note 注意報告內容要含以下基本要件:

1. It is preferable to answer those questions with examples and figures.
2. It is highly recommended that these examples have background information (ie, introduction), purposes of the study, methods used to answer the specific aims, results, the interpretation and the conclusion obtained.
3. The sources (ie, citing references 參考資料出處) of examples should be given at the bottom of the each powerpoint slide. 4. The references should be included in additional slides. Note that it is strongly recommended not to use only Wikipedia as source. If you have any questions, please address to 蔣輯武老師 at chiangcw@mail.ncku.edu.tw ext 3637

Assigned questions of individual groups of IMM and MT

- 1.(IMM1) A. Define **DNA** methylation B. Define CpG island. Do all human genes have CpG island at their promoters? C.How does **DNA** methylation (**Not about histone methylation**) affect the gene expression? Different molecular mechanisms have been identified, please some detailed explanation of their molecular mechanisms; give examples to illustrate your points.
- 2.(MT1) How can we detect **DNA** methylation? A. Describe the rationale of using bisulfide treatment to detect DNA methylation and B. describe methods including Methylation-Specific PCR (MSP) and Combined Bisulfite Restriction Analyses(COBRA).
3. (IMM2)Describe methods of genome-wide analysis of DNA methylation (It needs to include methods such as Next Generation Sequencing (NGS)).
4. (IMM3) Different DNA methyltransferases (DNMTs) are known to mediate the various DNA methylation processes. A. What are those DNMTs found in mammals? B. Please describe the following aspects regarding DNMTs, including how genes of DNMTs are regulated, roles of different DNMTs in the DNA methylation and mechanisms, and their specific physiological functions (including the phenotypes of

knockout of a specific DNMT) .

5. **(MT2)** There is molecular link and evidence that histone modifications may be linked to DNA methylation. **A.** What are the known histone modifications? **B.** How does histone modification affect DNA methylation? Please give examples to illustrate this event.

6. **(IMM4)** **A.** Is there any general pattern of DNA methylation in cancer? Why some CpG islands became hypermethylated, some became hypomethylated, and some remained unchanged? **B.** What is CpG island methylator phenotype (CIMP)? Is CIMP reliable for classification of tumors such as in colon cancer?

7. **(IMM5)** Use some examples to describe how changes of DNA methylation and histone modification of genome are correlated to cancer and discuss the possible causes of these changes, effects on the genome, and applications in cancer therapy.