

**GCA 2016-2017 January 27, 2017**

- 1) Describe the experiment of Griffith that led to the postulation of the transforming principle. What might have been the reasons that the conclusion that DNA was the genetic material was not accepted by that time in the scientific community?
- 2) What is the basis for strand discrimination in MMC in human cells?
- 3) Describe the so-called "smoking gun" evidence that P53 mutations in lung cancers can be attributed to direct DNA damage from cigarette smoke carcinogens.
- 4) Explain the mechanism of action of Olaparib and why this compound might be a promising anti-tumor agent in the case of so-called triple negative breast tumors.
- 5) Explain the molecular structure and function of the CTD tail of RNA polymerase.
- 6) Explain the mechanism of spreading of marks for heterochromatin, hypoacetylation of histon3/4 and methylation of Lys9 of histon3. Discuss the similarity in these processes.
- 7) Describe the principles of MethylC-Seq and BS-seq (not the deep sequencing part!)
- 8) Describe the experimental proof that non-CpG DNA methylation might be characteristic for the embryonic state of stem cells.
- 9) Does the paper by Agrelo et al. prove that: 1) LaminA/C plays a role in hematologic malignancies? 2) Hypermethylation of LaminA/C is the cause of hematologic malignancies? Explain your answers.
- 10) How do Ocampo *et al.* in their paper ***In Vivo Amelioration of Age-Associated Hallmarks by Partial Reprogramming*** achieve this reprogramming in the mice they use in their experiments? Why do they choose for *partial* reprogramming?

(20pts per answer)