**MODULE 3: Weeks 4-6: Systems Immunology in Action: Insights into Infections and Vaccinology**

**Week 4: Tuesday, 9/24/2024 Topic: *Group 1 Presentation: Predicting Vaccine Success: Systems Biology and the Yellow Fever Vaccine***

**Activities:**

* Group 1 Presentation:
  + The first group will present their analysis of the paper on predicting vaccine success using systems biology, specifically focusing on the yellow fever vaccine.
  + The presentation will cover the research methodology, key findings, and the implications of systems biology in enhancing vaccine efficacy predictions.

**Week 4: Thursday, 9/26/2024 Topic: *Group 2 Presentation: Decoding Influenza Vaccination: Systems Biology Insights***

**Activities:**

* Group 2 Presentation:
  + The second group will present their analysis of the systems biology approach to influenza vaccination, discussing how early molecular signatures can predict vaccine efficacy.
  + The presentation will include a discussion on the differences between TIV and LAIV vaccines and the role of systems biology in understanding these differences.

**Week 5: Tuesday, 10/1/2024; Topic: *Group 3 Presentation: The Future of Vaccine Design: Exploring Reverse Vaccinology 2.0***

**Activities**:

* Group 3 Presentation:
  + The third group will explore the concept of Reverse Vaccinology 2.0, focusing on its potential in designing vaccines that elicit functional antibodies.
  + The group will present the paper's methodology and discuss the future implications of this approach in vaccinology.

**Week 5: Thursday, 10/3/2024; Topic: *Group 4 Presentation: HIV-1 and Neutralizing Antibodies: A Battle for Control***

**Activities**:

* Group 4 Presentation:
  + The fourth group will present their analysis of the paper on the coexistence of broadly neutralizing antibodies and antibody-sensitive viruses in HIV-1 infection.
  + The presentation will delve into the mechanisms of antibody-mediated control and the challenges in designing effective HIV vaccines.

**Week 6: Tuesday, 10/8/2024; Topic: *Group 5 Presentation: Understanding Tuberculosis: Immune Factors Influencing Infection Outcomes***

**Activities**:

* Group 5 Presentation:
  + The fifth group will present their findings on the immune factors associated with different outcomes in tuberculosis infection.
  + The presentation will highlight the use of systems biology to identify immune signatures that influence the progression from latent to active tuberculosis.

**Week 6: Thursday, 10/10/2024; Topic: *Group 6 Presentation: COMBATing COVID-19 using Systems Immunology Approach***

**Activities:**

* Group 6 Presentation:
  + The final group will present their analysis of the multi-omics blood atlas study that identified immune signatures linked with COVID-19 severity and specificity.
  + The presentation will cover the methodology and key findings, emphasizing the role of systems immunology in understanding and combating COVID-19.

**Learning Objectives:**

* Students will demonstrate their ability to critically analyze and present complex scientific research in systems immunology.
* Students will learn how systems biology approaches are applied to real-world problems in infections and vaccinology.
* The presentations will foster peer learning and deepen understanding of systems immunology's applications and implications in medical research.

**Expected Outcome:**

* Each group will successfully present their research findings, demonstrating a comprehensive understanding of their assigned paper and its significance in Systems Immunology. The class will collectively enhance their knowledge of how systems biology addresses major challenges in infections and vaccinology.