

DATA SCIENCE – BIOLOGY-PHYSIOLOGY (Tsitsilonis-Kostopoulos) – 2024-2025

Mark the following statements as true (T) or false (F).

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| 1 | Systems immunology focuses, among others, in understanding the immune system as a whole and finding new ways to combat diseases proven refractory of classical approaches | |
| 2 | A major difference between innate and adaptive/specific immunity is that in innate immunity memory is limited or missing, whereas adaptive/specific immunity is characterized by long-term memory | |
| 3 | Secondary lymphoid organs are the bone marrow and the thymus. | |
| 4 | Phagocytosis is the engulfment and internalization of foreign materials, such as microbes, for their clearance and destruction | |
| 5 | One of the basic characteristics of adaptive/specific immunity is diversity, as we can produce 10^{14} different B cells and 10^{18} different T cells | |
| 6 | T lymphocytes that recognize a microbe differentiate to plasma cells and produce microbe-specific antibodies | |
| 7 | When an immune response ends, activated lymphocytes die by necrosis | |
| 8 | The Danger Theory proposes that the immune system recognizes pathogens, but it also recognizes self-molecules (danger signals) that derive from our cells under the 4Ds | |
| 9 | Danger signals (DAMPs) bind to Toll-like receptors (TLRs) and activate antigen-presenting cells (APCs), which then can stimulate adaptive/specific immune responses (T and B cells) | |
| 10 | Kidney transplants can be rejected even after 20 years, because the immunosuppressive drugs we use (e.g. cyclosporine) block the wrong signal (signal 1) on T cells | |
| 11 | The influenza virus mutates continuously and this is why we have to produce a new influenza vaccine every year | |
| 12 | Viral transmission (eg. SARS-CoV-2) from animals (eg. bats) to humans occurs when animals are stressed | |
| 13 | Vaccines elicit protective responses of the adaptive/specific immunity against pathogenic microorganisms by mimicking natural infection and causing disease | |
| 14 | Anti-HIV drugs target the enzymes that the HIV virus uses to enter the cells of the host and further integrate its genetic material in the host cell's mitochondrial DNA | |
| 15 | A mechanism that is responsible for causing autoimmunity is molecular mimicry, where a component (antigen) of a pathogen is similar to a self-antigen and thus, the immune system of the host is "confused" | |
| 16 | The immune system protects us against cancer, and this is verified by the higher incidence of cancer after immunosuppression/immunodeficiency (eg. in patients with AIDS or the elderly) | |

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| 17 | Cancer Immunotherapy focuses in inhibiting tumor growth but unfortunately, it facilitates cancer cell to metastasize | |
| 18 | We can administer a passive immunotherapy therapeutic protocol in cancer patients with a responsive immune system, but when the immune system of the patient is exhausted we administer active immunotherapy | |
| 19 | Tumor “Darwinism” refers to the fact that tumors have evolved sophisticated means to avoid immune detection | |
| 20 | To improve cancer immunotherapy, we need to find Biomarkers which will help us select those cancer patients that will likely benefit from immunotherapy | |