COVID-19 Research of NIT Arunachal Pradesh

Research Area	Others
Project Title	To Increase the Performance of Human Immune System to fight against COVID-19
Expected Outcome	To keep human immune system stronger or to improve the performance of immune system, the communication between T-cell and B-cell should be very fast and response of the B-cell to release the antibodies also should be fast and efficient.
Expected Timeline	One year
Remarks	
URL	
Pl details	Dr Swarnendu Kumar Chakraborty Asst. Professor, Dept. of CSE, NIT Arunachal Pradesh.
Pl email id	swarnendu@nitap.ac.in

To Increase the Performance of Human Immune System to fight against COVID-19

Antigen-Antibody of an immune system is one of the most challenging and promising research areas for Molecular Communication (MC) in Nanonetwork. It consists of several active cells which are used to communicate to protect from antigens. Antigens are substances that are capable to sustain for any appropriate condition which is responsible for inducing a specific immune response that is an antibody (specifically T-Lymphocytes (T-cell) and B-Lymphocytes (B-cell)). Immune Response is one of the signals that is activated only after body cells identify or discover self-cells or non-self-cells. When antigens enter inside the body through any media, it may cause many diseases. In case of the human body, an immune system involved to eliminate these antigens. The human immune system mainly consists of Antigen Presenting Cell (APC), Major Histocompatibility Complex (MHC), the T-cell and B- cell etc. The function of T and B cells are briefly given below:

- T- Cell is very active cell that is programmed to recognize and defend from the foreign substances. It contributes to defend against antigens in two different ways. One is directly communicating with antigens and another way is regulating the immune response.
- Upon receiving the immune response from T-cell, B-Cell is used to start producing an antibody. But, antibody can be produced only after T-cell communicated successfully by sending the molecules called Interleukin-2 to B-cell. Thus, this is how biological T-cell and B-cell are used to communicate for destroying the antigens.

Recently COVID-19 (Corona Virus Disease 2019) is spread all over the world and many people are died due to this disease. In order to protect and prevent from COVID-19 from our body, it is necessary to keep immune system stronger in human body.

In research point of view, corona virus can be considered as an antigen. The antigen (Corona Virus) can be killed by T killer cell by regulating the immune response or by antibodies which are released from B-cell. To improve the activity of killing antigens in human immune system, T-cell should be very active in order to communicate with B-cell very fast and to regulate the immune response. The antibodies are released when only B-cell received information successfully from T-cell to kill antigens. Monitoring of communication between T-cell and B-cell in Molecular Communication (MC) nano-network is very essential to fight against the antigens (i.e. corona virus).

Hence, the challenges to keep human immune system stronger or to improve the performance of immune system are the communication between T-cell and B-cell should be very fast and response of the B-cell to release the antibodies also should be fast and efficient.