Antibodies from convalescent plasma protect against COVID-19

- A team of scientists led by Dennis R. Burton from the Scripps Research Institute has discovered that neutralising antibodies present in the blood of COVID-19 infected who have recovered offers powerful protection against novel coronavirus in animals.

Role for antibodies

- The small animals that received high dose of antibodies did not lose weight and the amount of virus in the lungs was low compared with those that received low dose of the antibodies and the control group.
- The study suggests a role for neutralising antibodies in prophylaxis (treatment given to prevent a disease), and potentially therapy, of COVID-19.
- Prior to transferring and testing the ability of the antibodies to protect the animals from the virus, the researchers tested it on human cell cultures and found the antibodies to have superior ability to protect against the virus.
- Two different antibodies in five different concentrations were tested on the small animals to evaluate dose-dependent protection.
- The highest dose tested was 2 mg/animal and the lowest dose was 8 microgram/animal.
- The animals were challenged with the virus 12 hours after the antibodies were transferred. Lung tissues were collected to measure viral load on day 5 post virus challenge.
- In contrast to the antibody to receptor-binding domain (RBD) of the virus, the less potent and incompletely neutralising antibody showed no evidence of protection at any concentration compared to the control animals.

Promising study

- The authors state that the efficacy of the antibodies in Syrian hamsters is “promising” and suggest that human studies be undertaken based on animal trial results.
- Incidentally, the researchers also identified one antibody that can neutralise the 2002 SARS virus.
- According to the release, the antibodies can be injected into patients in the early stage of the disease to reduce the viral load and thus protect the patient from progressing to the severe form of the disease.
- The antibodies also may be used to provide temporary, vaccine-like protection against SARS-CoV-2 infection for healthcare workers, elderly people and others who respond poorly to traditional vaccines or are suspected of a recent exposure to the coronavirus.
- The antibodies can then be mass-produced either as a treatment to prevent deterioration of the disease and as a preventive vaccine, as in the case of Ebola virus, the release notes.
- More than 1,000 antibody-producing immune cells called the B cells were first isolated. These antibodies were isolated based on their ability to bind to the virus and prevent it from infecting the test cells.

Gene sequence

- Each of the 1,000 immune B cells produced a distinct antibody against the virus. In order to mass-produce the antibody, the scientists obtained the gene sequence of each
antibody.

- They then screened each antibody and 33 antibodies that could block the virus from binding to the test cells were identified.