ВЗАИМОСВЯЗИ ГОЛОВНОГО МОЗГА И СЕЛЕЗЕНКИ

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COMMUNICATIONS OF THE BRAIN AND SPLEEN

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The anatomical paths through which the brain and the spleen communicate are known now.

The spleen, once thought to be an unnecessary bit of tissue, is now regarded as an organ where important information from the nervous system reaches the immune system. Understanding this process could ultimately lead to treatments that target the spleen to send the right message when fighting human disease.

The spleen is an organ with important roles in regard to red blood cells and the immune system. In humans it is located in the left upper quadrant of the abdomen. It removes old red blood cells and recycles iron, synthesizes antibodies in its white pulp, removes from the circulation antibody-coated bacteria and antibody-coated blood cells. Recently it has been found to contain in reserve half the body's monocytes in its red pulp that upon moving to injured tissue such as the heart turn into dendritic cells and macrophages and aid wound healing. It is one of the centres of activity of the reticuloendothelial system, and can be considered analogous to a large lymph node. Its absence leads to a predisposition to certain infections.

The macrophages in the spleen were making tumour necrosis factor, a powerful inflammation-producing molecule. When they stimulated the vagus nerve the tumour necrosis factor (TNF) production in the spleen decreased. The stimulation of the vagus nerve increases survival in laboratory models of sepsis.

Every year, about 500,000 people develop severe sepsis, a syndrome triggered when the body's immune system wages an attack on the body that is well beyond its normal response to an invader. Sepsis kills about 225,000 deaths in the United States each year.

The hope is to modulate other immune functions like antibody production through the spleen (via vagus nerve stimulation) as a way to modify the course of infections and possibly some autoimmune disorders. The vagus nerve inherently communicates with the splenic nerve to suppress TNF production by macrophages in the spleen.

The vagus nerve (the major cranial nerve) acts through the splenic nerve to modulate immune functions. This points the way to a possible solution for treating sepsis. It may be more effective to take advantage of the central nervous system to control cells of the spleen.