

Why does arthritis start? The Dendritic Cell and T cell story

Robert Benson, Agapitos Patakas

Institute of Infection, Immunity and Inflammation, University of Glasgow, Glasgow, United Kingdom

1. A Confused Immune System

Dendritic cells are responsible for 'sensing' when the body is being attacked by foreign invaders. They then tell the soldiers of the immune system, the T cells, where to go and what to do. In Rheumatoid Arthritis this 'conversation' somehow goes wrong.

2. Wrong Instructions

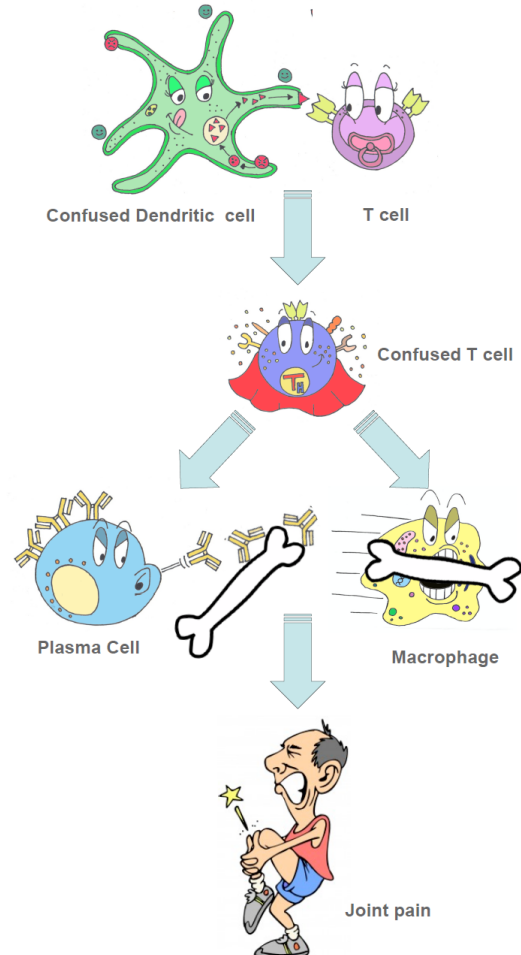
The first steps in this confusion probably occurs many years before the symptoms of disease start and in the organs where T cells and Dendritic cells meet – the lymph node. These are the areas where the immune cells talk to each other and organise the defense against foreign invaders. Genetic and environmental factors distort the message leading to a mistaken attack on a person's joints. In Rheumatoid Arthritis patients, confused Dendritic cells provide the T cell with the wrong information, instructing them to leave the lymph node and attack the body's own cells.

3. The coordinated attack

Misinformed T cells are then responsible for coordinating the attack on self. T cells that stay in lymph nodes instruct B cells to become plasma cells. These "weapons factories" of the immune system are told to produce antibodies that stick to the joints, making them a target for the rest of the immune system. Other T cells move out of the lymph node to co-ordinate the attack from inside the joint.

4. Mass migration

Antibodies sticking to bones act as a signal for reinforcements. The arrival of misinformed T cells travelling from the lymph nodes then coordinate the actions of the new recruits. Direct instructions from T cells even drive cells such as macrophages to eat the bone!



Steps to cure Rheumatoid Arthritis

By understanding the conversation between the Dendritic cell and T cell we can develop therapies to intervene. Dendritic cells might even be used as a tool to send the right message and we can turn off misinformed T cells for good.