Astrocytes are brain cells that do not use electrical signals to communicate. They use chemical signals instead and provide another way of transmitting information in the brain and back out to the body. Everything in the brain is embedded in astrocytes. Astrocytes have many functions in the brain, but one of the most important is the way that they react to nerve cells that are firing and do not stop firing. Astrocytes in pain pathways read this as if the brain is being invaded by dangerous substances and they release inflammatory chemicals to fight them off. The astrocytes are trying to protect the brain from an invader that is not present. The stimulus for this unending firing of nerve cells in the pain pathway can be nerve injury or inflammation in the body. If a peripheral nerve is damaged the unending firing happens immediately. Other injuries that lead to persistent pain occur because of inflammation in the peripheral body irritating and firing local nerves. This inflammation is activated during or subsequent to an injury, when local cells in the connective tissues of the body, called fibroblasts, release inflammatory chemicals. When this release doesn’t stop, local nerve signals to the brain set off a process called wind-up pain leading to spinal cord and brain nerve cells firing without stopping and at much higher rates than normal. These cells then set off a release of inflammatory chemicals in astrocytes and release their own pain neurotransmitter, Substance-P. Astrocytic inflammatory chemicals and nerve cell Substance-P keep the nerve cells firing and send much of this release back out to the spinal cord and down nerve cell axons out to the injury site in the body. This causes more release of inflammatory chemicals by fibroblasts and a continued firing of local nerves creating a perpetual vicious cycle from fibroblast to local tissue in the body and astrocytes to nerve cells in the brain. At the same time another loop is set up via brain astrocytes to fibroblasts in the body, then back to the brain via inflamed local nerves.