ART IN SCIENCE

Exploring nature's canvas: Witnessing the artistry of biodegradation

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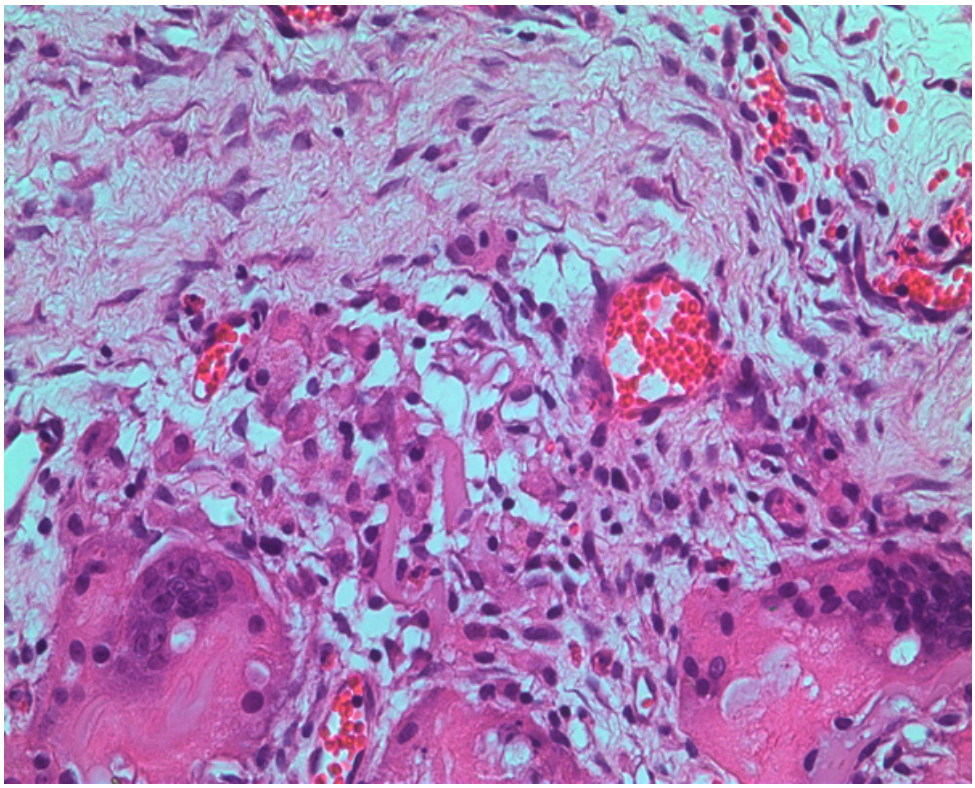

Histology image of a natural polymer- based scaffold subcutaneously implanted for 4 weeks at 40X magnification.

When natural polymers are subcutaneously implanted, they elicit a fascinating local tissue response characterized by intricate processes of biodegradation. The body's innate immune system recognizes these foreign materials and initiates an orchestrated series of events. Initially, an acute inflammatory response ensues, involving the recruitment of immune cells such as neutrophils and macrophages to the implantation site. These cells play a crucial role in the degradation process, releasing enzymes and reactive oxygen species that break down the natural polymers. As time progresses, the implant undergoes gradual biodegradation, facilitated by the enzymatic activity of specific cells and the surrounding tissue. Fibroblasts, for instance, contribute to the formation of new extracellular matrix components and aid in tissue remodelling. As the materials undergo biodegradation, they release bioactive molecules and signals that promote the formation of new blood vessels (angiogenesis). This local tissue response highlights the remarkable capacity of natural polymers to integrate with the host environment, paving the way for their potential application in regenerative medicine and tissue engineering.

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