

# Lymphatic injuries

## Finding new approaches to reduce secondary lymphedema

When someone is first diagnosed with breast cancer, one of the greatest fears is often “Has it spread?” Breast cancer tumor cells in the tumor mass commonly spread to distant sites in the body through lymph nodes and lymphatic vessels. Treatment for breast cancer often includes removing lymph nodes and vessels and examining them to determine whether or not the tumor cells have metastasized.

Unfortunately, these lymph nodes and lymphatic vessels are responsible for draining fluid from the arm and breast. Thus, as a consequence of a successful surgery to treat breast cancer, the arm can become painfully swollen and disfigured as fluid that is normally drained through the lymphatic system begins to accumulate in the arm. A cure for the swelling, known as secondary lymphedema, has not been found.

Jeremy Goldman is seeking that cure. “While enormous attention has been devoted to improving cancer detection and treatments that are enabling people with breast cancer to live longer and better lives, attention to secondary lymphedema is generally lacking,” notes Goldman.

Secondary lymphedema can cause a serious reduction in quality of life. The condition is present in approximately 25 percent of patients who have had lymph nodes removed during treatment for breast cancer.

Goldman and his team are working to find a treatment that will re-establish the lymphatic network and restore the flow of fluid away from the swollen arm. One approach includes activating growth factor receptors present on lymphatic endothelial cell membranes. “Activating vascular endothelial growth factor receptors -2 and -3 may help promote lymphatic regeneration and restore fluid drainage from the arm,” Goldman explains.

The team is employing experiments on mice. Initial results are highly encouraging. Goldman’s research has helped advance the understanding that these new lymphatic capillaries may not be functioning properly. “The reduced function may be related to a lack of interstitial fluid flow, or slow moving fluid that flows through the tissue, which occurred while the lymphatic capillaries were reforming,” he says.

Interstitial fluid flow may play an important role in distributing the growth factor in a manner that directs the organization of newly regenerated lymphatics into functional capillaries. Goldman and his team are presently working to improve the effectiveness of the growth factors by increasing interstitial flow through the tissue.

“Our research may be beneficial for anyone who has undergone surgery that removes lymph nodes in any part of the body,” he adds. “For example, it is common for surgeons to remove lymph nodes from the groin and these people often end up with lymphedema of the leg.”



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