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LETTER TO THE EDITOR

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Galectin-3 in venous thrombosis: A possible new target for improved patient care

Recently, an article published by Fashanu et al. brought valuable information to the galectin research area.[1] The findings, related to venous thrombosis, offer a new target to a disease that has seen little innovation in treatment beyond anticoagulation since the 1950s. The authors concluded that there was a positive association between galectin-3 levels and incidence of venous thromboembolism. Galectin-3 is an inflammatory biomarker often associated with cancer, fibrosis and other cardiovascular diseases. However, galectin-3's role in venous thromboembolism has just begun to be understood.

The role of inflammation in deep vein thrombosis (DVT) was established in 1974,[2] with further studies confirming sterile inflammation as a key player in the propagation and severity of the thrombotic process. For example, in 2010, the inflammatory cytokine interleukin-6 was shown to play a direct role in venous fibrosis, demonstrating its potential as a therapeutic target to prevent post thrombotic syndrome.[3] More recently, the role of galectin-3 and galectin-3 binding protein in venous thrombosis was identified by DeRoo et al. in 2015.[4] This basic science investigation used mice from three backgrounds: wild type, galectin-3 KO, and IL-6 KO, along with experimental groups receiving recombinant galectin-3.[4] Galectin-3 upregulation occurred in all thrombotic cellular components, including platelets, red blood cells, as well as nucleated blood elements. While there is much left to be understood regarding the role of galectin-3 in venous thromboembolism, the work of Fashanu et al.[1] provides clinical support for the DeRoo work,[4] and lays the foundation for further investigations for this promising new therapeutic target.

To grasp the gravity of this translational work, it is important to understand the state of current treatments and outcomes in venous thromboembolism. Current projections for this disease estimate that 900,000 Americans will develop DVT *every* year with the affected population expected to double by 2050.[5] Moreover, the cost of post-thrombotic syndrome, a long-term complication of DVT, is approximately 3 billion dollars per year in the US.[6] Why is post thrombotic syndrome such a significant financial burden? Because our current treatments for DVT do not effectively prevent post thrombotic syndrome or recurrent episodes of DVT. In fact, to give some perspective, the standard treatment of anticoagulation was established 2 years prior to the release of the first computer hard drive which stored 5 MB of information and weighed over a ton. Today, over 60 years later, computer technology has advanced to the point where we have the ability to store terabytes of information within a device the size of our hands. In retrospect to DVT treatment, there has been little progress as we have almost the same basic approach to treating this widespread disease. Therapeutics have stagnated on anticoagulation largely due to the lack of knowledge on the complex pathophysiology of DVT. Given the current outcomes, it is clear that we need a better understanding of the disease to allow us to identify potential new treatment targets.

Despite the great efforts that researchers, funding agencies and foundations are putting towards DVT, it is clearly not enough. It is the responsibility of all parts to develop better options to treat our patients. We know this long-term goal will require enormous effort and funding, but we are convinced that uncovering the complexities of DVT's pathophysiology and linking basic science data to clinical data, as was done in Fashanu et al., will lead to much needed improvements for all those suffering from venous thromboembolism. The research completed by Fashanu et al. also invites for future work about the interactions of other diseases that have known associations with galectin-3 and DVT, such as cancer. Both cancer patients and DVT patients have increased levels of galectin-3, which provokes the question of how exactly this protein contributes to these diseases, both separately and conjunction with one another.[7] Investigations like the one conducted by Fashanu et al. continue to point us closer to solving this mystery, so let us strengthen our efforts to use basic science findings in fueling better treatments for DVT.

RELATIONSHIP DISCLOSURES

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