Meet the Marker: CD54 (ICAM-1)
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Cluster of Differentiation 54 (CD54), also known as Intercellular Adhesion Molecule 1 (ICAM-1), is a 90 kDa glycosylated transmembrane protein of the immunoglobulin superfamily. CD54 (ICAM-1) can play an important role in immunological synapse formation, T-cell activation, leukocyte migration, and numerous cellular immune responses. CD54 (ICAM-1) also interacts with integrin receptors on leukocytes, such as lymphocyte function-associated antigen-1 (LFA-1), to enhance cell-cell adhesion and promote immune cell recruitment and activation. Its multifaceted role in mediating leukocyte-endothelial interactions may demonstrate its importance in various physiological and pathological processes.

In clinical diagnostics, elevated CD54 (ICAM-1) expression is observed in various inflammatory conditions, including rheumatoid arthritis, inflammatory bowel disease, and atherosclerosis, correlating with disease severity and progression. Its response to inflammatory cues, such as cytokines interleukin-1 (IL-1) and tumor necrosis factor-alpha (TNF-α), can be pivotal in orchestrating immune responses and may contribute to the pathogenesis of inflammatory disorders.

In cardiovascular diseases, CD54 (ICAM-1)-mediated leukocyte recruitment to atherosclerotic plaques may promote inflammation and plaque destabilization, driving disease progression. Additionally, CD54 (ICAM-1) expression in tumor endothelium may correlate with tumor aggressiveness & metastatic potential, potentially highlighting its role in tumor angiogenesis and dissemination. While some studies have shown that CD54 (ICAM-1) promotes tumor metastasis by regulating various signaling pathways in some cancers including colorectal, breast, lung, other studies have shown non-metastatic solid tumor to express minimal or no CD54 (ICAM-1).

In conclusion, CD54 (ICAM-1) can hold pivotal clinical significance across various pathological contexts. Its role in mediating leukocyte adhesion and transendothelial migration during inflammation may show in autoimmune diseases and cancer, where its expression facilitates immune cell infiltration into target tissues and promotes tumor metastasis. Understanding CD54 (ICAM-1)'s mechanisms may offer avenues for targeted interventions in inflammatory disorders, autoimmune diseases, cardiovascular diseases, and cancer.

To learn more about the markers listed above, please visit our website at biocare.net or call 1-800-799-9499, option #3


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CD54 Illustration / Photomicrograph

Image showing the process of leukocytes extravasation from blood vessels to tissue.