Claudins and Cancer: Promising Proteins for Detection and Diagnosis
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Claudin family proteins are transmembrane proteins that serve as major cell adhesion molecules of tight junctions. “Tight junctions restrict the flow of ions and aqueous molecules between cells, and their permeability is determined by the profile of claudin expression and arrangement of claudins with other proteins at the paracellular barrier.”¹ In several cancers, this family of proteins is abnormally regulated, but certain claudins, like Claudin-4, are more frequently overexpressed in neoplasias.

Claudin-4 (Clostridium perfringens enterotoxin (CPE) receptor) is a tight junction protein encoded by the gene CLDN4. Depending on the type of cancer, expression of Claudin-4 has been associated with either poor prognosis or a more favorable diagnosis. Claudin-4 has been shown to distinguish adenocarcinoma from malignant mesothelioma with 99% specificity in malignant effusions.² Overexpression of Claudin-4 was able to independently predict survival in a breast cancer multivariate analysis as it was associated with poor prognosis, high tumor grade and Her2 expression and was inversely correlated with estrogen receptor staining.³ In luminal breast cancer, the increase of Claudin-4 protein was correlated with the increase of tumor grade and Ki-67, and thus demonstrated an overall shorter life survival.⁴ On the other hand, the presence of Claudin-4 in triple negative breast cancer demonstrated a favorable prognosis.⁴ Claudin-4 has been shown to be among the most highly upregulated genes in ovarian cancer⁵ and overexpression in prostate cancer may suggest a Claudin-4 targeted therapy as a potential treatment.⁶

As part of the formation and maintenance of epithelial tight junctions, Claudin-4 participates in creating a barrier that can repel pathogenic invaders. A recent study has suggested that COVID-19 can promote the secretion of “cytokines that have been associated with increases in barrier dysfunction and mislocalization of tight junction proteins, such as… Claudin-4.”⁷ Research continues to be performed to find treatments that can exhibit a “sealing effect” on respiratory tight junctions and decrease severity of COVID infection.

Interested in testing Claudin-4 in your lab? We're here to assist you. Please contact Biocare anytime at 800-799-9499 or click the link here: https://biocare.net/product/claudin-4/

¹. https://www.rndsystems.com/target/claudin-4