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In various types of cardiovascular disease, the biochemical reactions of matrix metalloproteinase-2 (MMP-2) and matrix metalloproteinase-9 (MMP-9) are known to play a vital role in the process of collagen, gelatin and elastin breakdown. While furthering investigation and implementation of a MMP-2 model in the literature, my project is to develop a similar model for MMP-9 and integrate the MMP-9 and MMP-2 models in association with estrogen studies. Pathways involving estrogen will be integrated in the MMP theoretical model to better understand how hormone replacement therapy, in postmenopausal women, can have positive and negative effects on cardiovascular disease due to smooth muscle cell migration. Literature reports that estrogen is involved in the MMP mechanisms responsible for vascular remodeling with endothelial cells and smooth muscle cells. This project also has important implications for other disease process involving matrix metalloproteinases such as angiogenesis in tumor formation, atherosclerosis, and some orthopedic diseases.

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