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(54) **Title:** PRODUCTION OF FC-FUSION POLYPEPTIDES IN EUKARYOTIC ALGAE

(57) **Abstract:** Methods and compositions are disclosed to engineer plastids comprising heterologous genes encoding immuno-activating domains fused to an extracellular domain (ECD) of a receptor or surface glycoprotein, a growth factor or an enzyme and produced within a subcellular organelle, such as a chloroplast. The immuno-activating domains may include those regions of a protein capable of modulating the interaction between immune effector cells via proteins containing stereoselective binding domains and specific ligands, such as the Fc regions of antibodies. The present disclosure also demonstrates the utility of plants, including green algae, for the production of complex multi-domain fusion proteins as soluble bioactive therapeutic agents.