Unique binding affinity between novel dockerin in EngG and cohesin modules in scaffolding protein from *Clostridium cellulovorans*

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Integration of cellulosomal components occurs via highly ordered protein:protein interactions between cohesins and dockerins. We detected an endoglucanase called endoglucanase G from Clostridium cellulovorans using cohesin biomarker, containing glycosyl hydrolase family 5 and novel type dockerin module, domain of unknown function 291 (DUF291) which differs from other dockerin modules in cellulosomal enzymes. EngG had synergistic effect with exoglucanase (ExgS) on hydrolysis of crystalline cellulose when it assembled to scaffolding protein. In competitive enzyme-linked interaction assay the competitors such as EngE and ExgS inhibited the binding of EngG with cohesins over 80%, the results indicated that cohesins preferred to bind the other cellulosomal enzymes than EngG proteins. In addition, we performed surface plasmon resonance analysis for measuring quantitatively the affinity between EngG and cohesin modules, the dockerin in EngG had a relatively weak affinity (~100 fold) comparing EngE and ExgS. Thus, the novel dockerin in EngG contributed to assemble the cellulosome from C. cellulovorans by unique binding pattern about cohesin-dockerin interaction.