



**Fig. S6.** Postulated anaerobic DCM catabolic pathway in ‘Ca. Dichloromethanomonas elyunquensis’ strain RM. DCM is metabolized via the Wood–Ljungdahl pathway (WLP). DCM is initially dechlorinated and converted to methylene-tetrahydrofolate ( $\text{CH}_2=\text{H}_4\text{folate}$ ) by a yet unknown enzyme.  $\text{CH}_2=\text{H}_4\text{folate}$  is completely mineralized to  $\text{CO}_2$  and  $\text{H}_2$  via the reversed WLP (oxidative direction, solid lines). A small part of  $\text{CH}_2=\text{H}_4\text{folate}$  is assimilated and further reduced via the WLP (dashed lines) to generate intermediates (e.g.,  $\text{CH}_3\text{-H}_4\text{folate}$  and acetyl-CoA) for anabolic reactions. The complete WLP is encoded on the genome of strain RM and proteomics detected all of the WLP proteins. WLP proteins were expressed in DCA- and DCM-grown cells with higher abundances of most WLP proteins observed in cultures grown with DCM (see **Fig. 6**).