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pBL1 is a Lactococcus lactis theta-replicating 10.9-kbp plasmid that encodes the synthetic machinery of the bacteriocin Lcn972. In this work, the transcriptomes of exponentially growing L. lactis strains with and without pBL1 were compared. A discrete response was observed, with a total of 10 genes showing significantly changed expression. Upregulation of the lactococcal oligopeptide uptake (opp) system was observed, which was likely linked to a higher nitrogen demand required for Lcn972 biosynthesis. Strikingly, celB, coding for the membrane porter IIC of the cellobiose phosphoenolpyruvate-dependent phosphotransferase system (PTS), and the upstream gene lmg0186 were downregulated. Growth profiles for L. lactis strains MG1363, MG1363/pBL1, and MG1363 Delta celB grown in chemically defined medium (CDM) containing cellobiose confirmed slower growth of MG1363/pBL1 and MG1363 Delta celB, while no differences were observed with growth on glucose. The presence of pBL1 shifted the fermentation products toward a mixed acid profile and promoted substantial changes in intracellular pool sizes for glycolytic intermediates in cells growing on cellobiose as determined by high-pressure liquid chromatography (HPLC) and nuclear magnetic resonance (NMR). Overall, these data support the genetic evidence of a constriction in cellobiose uptake. Notably, several cell wall precursors accumulated, while other UDP-activated sugar pools were lower, which could reflect rerouting of precursors toward the production of structural or storage polysaccharides. Moreover, cells growing slowly on cellobiose and those lacking celB were more tolerant to Lcn972 than cellobiose-adapted cells. Thus, downregulation of celB could help to build up a response against the antimicrobial activity of Lcn972, enhancing self-immunity of the producer cells.

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