Escherichia coli tolerance of ultraviolet radiation by *in vivo* expression of a short peptide designed from late embryogenesis abundant protein

ABSTRACT

Ultraviolet (UV) radiation causes damage in all living organisms, including DNA damage that leads to cell death. Herein, we provide a new technique for UV radiation protection through intracellular short peptide expression. The late embryogenesis abundant (LEA) peptide, which functions as a shield that protects macromolecules from various abiotic stress, was obtained from the *Polypedilum vanderplanki* group 3 LEA protein. Recombinant *Escherichia coli* BL21 (DE3) expressing functional LEA short peptide *in vivo* were exposed to UVA and UVC radiation for 4, 6, and 8 h. *E. coli* transformants expressing the LEA peptide showed higher cell viability under both UVA and UVC treatment at all time points as compared with that of the control. Furthermore, the cells expressing LEA peptide showed a higher number of colony-forming units per dilution under UVA and UVC treatment. These results suggested that expression of the short peptide could be useful for the development of genetically modified organisms and in applications that require resilience of organisms to UV radiation.

Keyword: Escherichia coli; Short peptide; Ultraviolet radiation; Late embryogenesis abundant protein