
Abstract
Animal and human studies have shown that low levels of folic acid are associated with an impaired DNA Repair Capacity (DRC) and an increased cancer risk. However, the molecular evidence that folic acid enhances the DRC of cultured human cells is still limited because of a paucity of in vitro studies. We investigated the effect of folic acid depletion in vitro on the DRC of human dermal fibroblasts derived from 17 donors of different ages. To assess the cellular Nucleotide Excision DRC, we used a modified Host Cell-Reactivation Assay (HCRA), adapted to the Fluorescence Activated Cell Sorting (FACS)-technology, which is highly sensitive in comparison to luminometer-technology and allows single cell based analysis. We used DsRed as a reporter (irradiated with UVC light) and pEGFP to control the performance of the transformations. Folic acid had a statistically significant effect on the DRC in all of the 17 donors, however, the levels varied considerably between individuals (2.0–19.6%). When the effect of folic acid substituted on the DRC was compared to donor age, we observed that there was less DNA repair in old donors compared to the younger donors, although this was only significant at lower levels.