Abstract

Glioblastoma (GBM) is one of the most untreatable and life-threatening gliomas to date. Attempts to administer effective immunotherapy have so far been overshadowed by the immunosuppressive nature of GBM, which has been theorized to be connected to macrophages through the PDGFR/STAT3/IL-6 pathway in GBM. Immunofluorescence staining of CT-2A GBM-injected mouse tissue models revealed that macrophages and IL-6 were more present in tumor areas than non-tumor areas. A172 GBM cell culture models with THP-1 macrophage cells and isolated PDGF-BB were also made, to which measurements of their protein levels with western blotting showed that PDGFR inhibition successfully decreased intracellular IL-6 levels in A172 GBM cells supplemented with isolated PDGF-BB, but not in the ones co-cultured with macrophages. In silico analysis on possible correlations between PDGFs, PDGFRs, STAT3, and IL-6 RNA transcription levels in GBM patients from three datasets was then finally done, where it was found that PDGFRB and PDGFC may be much more connected to STAT3 and IL-6 than initially thought. This research rejected the idea that macrophage-induced PDGFR signaling affects IL-6 signaling in A172 cells, but its findings suggest the need for further repetitions and research to obtain a sure conclusion. It is hoped that these findings may help future experiments on GBM immunosuppression in order to develop effective immunotherapeutic treatments against the devastating illness.

Keywords: A172 glioblastoma, IL-6, Immunosuppression, PDGFR, THP-1 macrophage