PLK4

PLK4 encodes a member of the polo family of serine threonine protein kinases. The protein localizes to centrioles—complex microtubule-based structures found in centrosomes—and regulates centriole duplication during the cell cycle.

Overexpression of PLK4 results in centrosome amplification, and knockdown of PLK4 results in loss of centrosomes.

Bortezomib is a boronic acid-based potent proteasome inhibitor that has been actively studied for its anti-tumour effects through inhibition of the proteasome. The proteasome is a key component of the ubiquitin-proteasome pathway that is critical for protein homeostasis, regulation of cellular growth, and apoptosis. Overexpression of polo-like kinase 4 (PLK4) is commonly reported in tumour cells and increases their invasive and metastatic abilities. In this study, we established a cell model of PLK4 knockdown and overexpression in LN-18, A172 and LN-229 cells and found that knockdown of PLK4 expression enhanced the anti-tumour effect of bortezomib. We further found that this effect may be mediated by the PTEN/PI3K/AKT/mTOR signalling pathway and that the apoptotic and oxidative stress processes were activated, while the expression of matrix metalloproteinases (MMPs) was down-regulated. Similar phenomenon was observed using in vitro experiments. Thus, we speculate that PLK4 inhibition may be a new therapeutic strategy for GBM [1].

1)
Wang J, Ren D, Sun Y, Xu C, Wang C, Cheng R, Wang L, Jia G, Ren J, Ma J, Tu Y, Ji H. Inhibition of PLK4 might enhance the anti-tumour effect of bortezomib on glioblastoma via PTEN/PI3K/AKT/mTOR signalling pathway. J Cell Mol Med. 2020 Mar 3. doi: 10.1111/jcmm.14996. [Epub ahead of print] PubMed PMID: 32126150.