Tacrolimus, a topical calcineurin inhibitor, could be used as a candidate compound for chondrosarcoma treatment.

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A rare kind of malignant bone tumor called a chondrosarcoma is typically located in the spine. These forms of cartilage-forming bone sarcomas are known for their resistance to traditional chemotherapy and radiation therapy. Chondrosarcomas are heterogeneous and the molecular landscape may vary among different cases. Understanding the basic basis of chondrosarcoma is crucial, as it could facilitate the identification of possible therapeutic targets. The advancement of technology in silico studies shows promise for discovering potential targeted treatments for cancer. Gene2Drug, a Pathway-based Rational Drug Repositioning website, was used to find compounds that target the PBRM1 (polybromo-1) gene. DSEA (Drug Set Enrichment Analysis) was used to assist in in-silico screening. The anti-tumor activities of candidate drugs were extracted from DepMap via a PRISM viability assay on nine chordoma cell lines. A total of 665 compounds were analyzed using the DRUG Sensitivity (Drug Sensitivity AUC (CTD^2)) Tool. Tacrolimus is a topical calcineurin inhibitor that is used to treat moderate-to-severe atopic dermatitis and prevent organ transplant rejection. This study showed tacrolimus could be used as a potential therapeutic effect on chondrosarcoma cell lines (8.29E–9). Therefore, tacrolimus showed the most promising potential as a PBRM1-targeted treatment for candidate in chondrosarcoma. If further validated, this approach could offer a personalized treatment option based on the molecular characteristics of the tumor.