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**APPLICATION OF CRUMPLED ALUMINUM HYDROXIDE NANOSTRUCTURES FOR  
CANCER TREATMENT**

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The tumor microenvironment regulates tumor progression and the spread of cancer in the body. Applications of nanomaterials that can dysregulate tumor-microenvironment is emerging as a promising anti-cancer approach, which can improve the efficacy of existing cancer treatments. We have discovered that agglomerates of radially assembled Al hydroxide crumpled nanosheets with a disordered defective surface structure have a large positive charge and therefore can lead to ion imbalance at the cell perimembranous space through the selective adsorption of extracellular anionic species. This effect was demonstrated in vitro by reduced viability and proliferation of tumor cells, and further validated in a murine melanoma cancer model. Furthermore, crumpled Al hydroxide nanostructures showed a much stronger suppressive effect on tumor growth in combination with a minimally effective dose of doxorubicin. Taken together, the described approach of tumor microenvironment dysregulation through selective adsorption properties of folded crumpled nanostructures opened a new avenue for development of innovative anticancer therapy strategies.

I. Lerner M.I., Mikhaylov G., Tsukanov A., Lozhkomoev A., Gutmanas E., Gotman I., Bratovs A., Turk V., Turk B., Psakhye S.G., Vasiljeva O. Crumpled Aluminum Hydroxide Nanostructures as a Microenvironment Dysregulation Agent for Cancer Treatment. *Nano Lett.* (2018) Sep 12;18(9):5401-5410.