Researchers at the University of South Florida have identified a novel composition and method for chemotherapeutic treatment of leukemia.

A major contributing factor to the high mortality rate associated with acute myeloid leukemia (AML) and other cancers is the development of resistance to chemotherapy and death receptor-mediated apoptosis. Cancer cells frequently evade chemotherapy-induced cell death via a process referred to as de novo drug resistance, which is likely one of the first steps involved in acquired drug resistance. While several new drugs have been identified in the last decade and these treatments have increased the initial response rate, they have failed to increase life expectancy. Moreover, these drugs have significant adverse effects that limit their usefulness. This has led to a great need for the discovery of novel biomarkers and targets that will provide superior therapy for cancer treatment.

Scientists at the University of South Florida have developed a cancer treatment that targets Orai3, a protein that modulates calcium ion channels, using tipifarnib and 2-aminoethoxydiphenyl borate (2-APB). This composition increases intracellular calcium (Ca^{2+}) and triggers cell death in leukemia cell lines. Orai3 is an ideal target for chemotherapeutic intervention that can overcome the drug resistance problem that often hinders the usefulness of other targets. The limited expression of Orai3 in normal native cell types in humans reduces the likelihood of adverse side effects. This means of dysregulating intracellular Ca^{2+} homeostasis presents a therapeutic option that improves outcomes and extends survival.

**ADVANTAGES:**
- Reduces adverse side effects
- Overcomes cell adhesion-mediated drug resistance

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