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Leukemia is the leading cause of death in children. The discovery of effective cancer therapies is imperative to combat this deadly disease. The National Center for Natural Products Research (NCNPR) has comprised a library of over 4,000 organic extracts derived from plants, fungi, marine, and algae species with potential anti-cancer properties. In partnership with NCNPR, we have developed a rapid and effective method for screening large quantities of these organic compounds for anti-cancer efficacy against THP-1 cells (a monocytic leukemia cell line). A microtiter-based AlamarBlue Assay was used to identify extracts that reduced the viability of the THP-1 cells. For this assay, THP-1 cells were treated with an extract from the NCNPR library and were incubated at 37°C, 5% CO₂ for 24 hours. Subsequently, resazurin was added and incubated for an additional 24 hours. Change to a red color was an indicator of viability. Cells treated with extracts that produced little to no color change were identified as leads. One hundred forty-nine lead extracts have been further evaluated for toxicity to HeLa cells (a cervical cancer cell line) to determine whether these compounds may be more broadly applicable.