Characterization and Testing of Compounds Produced by Aspergillus turcosus that Target Cancer-Associated Pathways

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The Berkeley Pit was once an open pit mine, but today it is a highly acidic and toxic lake. The Berkeley Pit is home to many different species of extremophilic fungi. These fungi have developed the ability to produce bioactive compounds that act as a defense against the harsh environment of the Berkeley Pit. Relating to this research is the acidic and oxidative environment of the Berkeley Pit. These factors affect analogous pathways in fungi and mammalian systems, with the mammalian pathways relating to the onset (caspase-1) and progression (MMP-3) of cancer. Because of this it was hypothesized that the Pit fungus Aspergillus turcosus would produce compounds that target pathways associated with cancer. To test this, the PM 16-149 $CHCl_3$ enzyme inhibiting crude extract was run through two silica gel columns and an HPLC in order to isolate the active compounds. This yielded the known compound Pseurotin A. However Pseurotin A had never been tested for caspase-1 and MMP-3 inhibition. The results from the caspase-1 and MMP-3 signal transduction assays show that Pseurotin A is a potent inhibitor of MMP-3, however it shows no caspase-1 inhibition. These results indicate that Pseurotin A may be able to inhibit certain cancer cell lines.

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