Aqueous extracts of the marine brown alga Lobophora variegata inhibit HIV-1 infection at the level of virus entry into cells.

Abstract:

In recent years, marine algae have emerged as a rich and promising source of molecules with potent activities against various human pathogens. The widely distributed brown alga Lobophora variegata that is often associated with tropical coral reefs exerts strong antibacterial and antiprotozoal effects, but so far has not been associated with specific anti-viral activities. This study investigated potential HIV-1 inhibitory activity of L. variegata collected from different geographical regions, using a cell-based full replication HIV-1 reporter assay. Aqueous L. variegata extracts showed strong inhibitory effects on several HIV-1 strains, including drug-resistant and primary HIV-1 isolates, and protected even primary cells (PBMC) from HIV-1-infection. Anti-viral potency was related to ecological factors and showed clear differences depending on light exposition or epiphyte growth. Assays addressing early events of the HIV-1 replication cycle indicated that L. variegata extracts inhibited entry of HIV-1 into cells at a pre-fusion step possibly by impeding mobility of virus particles. Further characterization of the aqueous extract demonstrated that even high doses had only moderate effects on viability of cultured and primary cells (PBMCs). Imaging-based techniques revealed extract effects on the plasma membrane and actin.
filaments as well as induction of apoptosis at concentrations exceeding EC50 of anti-HIV-1 activity by more than 400 fold. In summary, we show for the first time that L. variegata extracts inhibit HIV-1 entry, thereby suggesting this alga as promising source for the development of novel HIV-1 inhibitors.