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Screening on the Novel Bioactive Compounds from Marine Micro-Bacteria Parasitismed on Sea Algae

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Summary

The human genome encodes at least 15 pols to conduct cellular DNA synthesis. Eukaryotic cells contain three replicative pols (α, δ and ε), mitochondrial pol γ, and at least eleven non-replicative pols [β, ζ, η, θ, ι, κ, λ, μ, ν, terminal deoxynucleotidyl transferase (TdT) and REV1]. Based on sequence homology, eukaryotic pols can be divided into four main different families, A, B, X, and Y. In this study, we isolated fungal strains from marine living things, such as seaweeds, corals and sea mosses, and obtained 38 strains. These marine strains were screened, and 31 fungal strains had inhibitory activity against mammalian pols. We purified natural compounds that selectively inhibit each of these eukaryotic pols, and we succeeded in identifying novel compounds with pol inhibitory activity from marine microbiological products, as detailed below.

1-Deoxyrubralactone (**1**) is a novel rubralactone derivative isolated from cultures of HJ33moB strain derived from seaweed, and their structures were determined by spectroscopic analyses. These compounds selectively inhibited the activities of X- and Y-families of mammalian pols.

Kasanosins A (**2**) and B (**3**) are novel azaphilones isolated from cultures of *Talaromyces* sp. derived from seaweed. These compounds selectively inhibited the activities of mammalian pols β and λ in family X of pols.

Hymenoic acid (**4**) is a novel sesquiterpene isolated from cultures of a fungus, *Hymenochaetaceae* sp.. This compound selectively inhibited the activity of human pol λ *in vitro*.

Penicilliols A (**5**) and B (**6**) are isolated from cultures of *Penicillium daleae* K.M. Zalessky derived from sea moss. These compounds selectively inhibited the activities of mammalian family Y of pols, such as pols η, ι and κ.

Trichoderonic acid B (**7**) is a novel terpenoid isolated from cultures of a fungus, and this compound selectively inhibited the activity of mammalian X-family pols, such as pols β, λ and TdT.

Compounds **5** - **7** suppressed the proliferation of human cancer cells, and did not affect the normal cell growth; therefore, these compounds could be anti-cancer chemotherapy agents.