

Supplementary Materials

Discovery of DNA topoisomerase I inhibitors with low-cytotoxicity based on virtual screening from natural products

Lan-Ting Xin^{1,2 †}, Lu Liu^{1,2 †}, Chang-Lun Shao^{1,2}, Ri-Lei Yu^{1,2}, Fang-Ling Chen^{1,2}, Shi-Jun Yue^{1,2}, Mei Wang^{1,2}, Zhong-Long Guo^{1,2}, Ya-Chu Fan^{1,2}, Hua-Shi Guan^{1,2 *}, Chang-Yun Wang^{1,2 *}

¹ Key Laboratory of Marine Drugs, The Ministry of Education of China, School of Medicine and Pharmacy, Ocean University of China, Qingdao 266003, P. R. China; xinlanting1993@163.com (L.-T. X.); liu_qd@yahoo.com (L. L.); shaochangelun@163.com (C.-L. S.); rileiyu2010@hotmail.com (R.-L. Y.); Chenfangling0410@hotmail.com (F.-L. C.); shijun_yue@163.com (S.-J. Y.); caoyuxiaowu@163.com (M. W.); 15726227761@163.com (Z.-L. G.); fanyachu@163.com (Y.-C. F.)

² Laboratory for Marine Drugs and Bioproducts, Qingdao National Laboratory for Marine Science and Technology, Qingdao 266071, P. R. China

* Correspondence: changyun@ouc.edu.cn (C.-Y. W.); hsguan@ouc.edu.cn (H.-S. G.)
Tel.: +86 532 82031536 (C.-Y. W.); +86 532 82031667 (H.-S. G.)

† These authors contributed equally to this work.

List of Supplementary Materials

Table S1 138 compounds derived from coral-derived fungi and plants.

Table S2 The binding energy of 138 compounds bound with the crystal structure of the ternary complex of topotecan-DNA-Topo I.

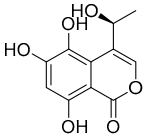
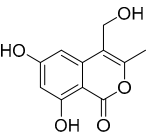
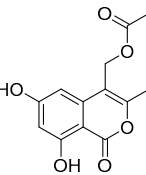
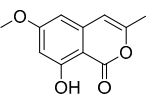
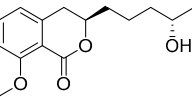
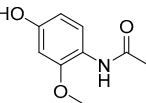
Figure S1 DNA Topo I inhibitory activities of (-)-epigallocatechin 3-*O*-(*E*)-*p*-coumaroate (**1**), (-)-epigallocatechin 3-*O*-(*Z*)-*p*-coumaroate (**2**), (-)-epigallocatechin (**3**), quercetin (**4**) and alvertoxin I (**9**) at 50 μ M.

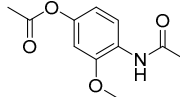
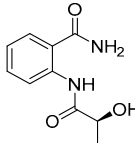
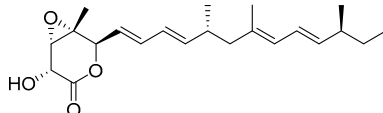
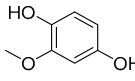
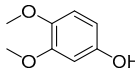
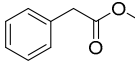
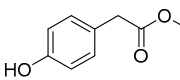
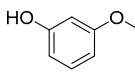
Figure S2 DNA Topo I inhibitory activities of (-)-epigallocatechin 3-*O*-(*E*)-*p*-coumaroate (**1**), (-)-epigallocatechin 3-*O*-(*Z*)-*p*-coumaroate (**2**), (-)-epigallocatechin (**3**), quercetin (**4**) and alvertoxin I (**9**) at 25 μ M.

Figure S3 DNA Topo I inhibitory activities of (-)-epigallocatechin 3-*O*-(*E*)-*p*-coumaroate (**1**) and (-)-epigallocatechin 3-*O*-(*Z*)-*p*-coumaroate (**2**) at 1, 5, and 10 μ M.

Figure S4 DNA Topo I inhibitory activities of (-)-epigallocatechin (**3**) and quercetin (**4**) at 1, 5, and 10 μ M.

Table S1 138 compounds derived from coral-derived fungi and plants.

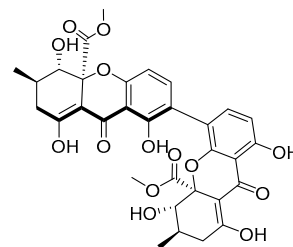
Compounds	Sources	Structures	Low/non-cytotoxicity ^a
<i>S</i> -(-)-5,6,8-Trihydroxy-4-(1'-hydroxyethyl)isocoumarin	Gorgonian-derivd fungi <i>Penicillium purpurogenum</i>		Ref. [1]: HL-60: no cytotoxicity; K562: no cytotoxicity; A549: no cytotoxicity.
Sescandelin B	Gorgonian-derivd fungi <i>Penicillium purpurogenum</i>		Ref. [2]: CF-1: weak cytotoxicity at 2 µg/ml.
Penicimarin E	Gorgonian-derivd fungi <i>Penicillium purpurogenum</i>		Ref. [1]: HL-60: no cytotoxicity; K562: no cytotoxicity; A549: no cytotoxicity.
8-Hydroxy-6-methoxy-3-methylisocoumarin	Gorgonian-derivd fungi <i>Penicillium purpurogenum</i>		Ref. [3]: HCT-8: IC ₅₀ > 25 µg/ml; MDA-MB-435: IC ₅₀ > 25 µg/ml; SF295: IC ₅₀ > 25 µg/ml; HL-60: IC ₅₀ > 25 µg/ml.
Penicimarin B	Gorgonian-derivd fungi <i>Penicillium purpurogenum</i>		Ref. [1]: HL-60: no cytotoxicity; K562: no cytotoxicity; A549: no cytotoxicity.
<i>N</i> -(4-Hydroxy-2-methoxyphenyl)acetamide	Gorgonian-derivd fungi <i>Penicillium purpurogenum</i>		Our test: Hela: no cytotoxicity; RD: no cytotoxicity; Hep-2: no cytotoxicity; A549: no cytotoxicity.

4-Acetoxy-2-methoxyacetanilide	Gorgonian-derivd fungi <i>Penicillium purpurogenum</i>		Our test: Hela: no cytotoxicity; RD: no cytotoxicity; Hep-2: no cytotoxicity; A549: no cytotoxicity.
S-(-)-2-(2-Hydroxypropanamido)benzamide	Gorgonian-derivd fungi <i>Penicillium purpurogenum</i>		Our test: Hela: no cytotoxicity; RD: no cytotoxicity; Hep-2: no cytotoxicity; A549: no cytotoxicity.
Nafuredin	Gorgonian-derivd fungi <i>Penicillium purpurogenum</i>		Ref. [4]: L5178Y: no cytotoxicity.
2-Methoxybenzene-1,4-diol	Gorgonian-derivd fungi <i>Penicillium purpurogenum</i>		Our test: Hela: IC ₅₀ > 10 μM; RD: IC ₅₀ > 10 μM ; Hep-2: IC ₅₀ > 10 μM ; A549: IC ₅₀ > 10 μM.
3,4-Dimethoxyphenol	Gorgonian-derivd fungi <i>Penicillium purpurogenum</i>		Our test: Hela: no cytotoxicity; RD: no cytotoxicity; Hep-2: no cytotoxicity; A549: no cytotoxicity.
Phenyl-acetic acid methyl ester	Gorgonian-derivd fungi <i>Penicillium purpurogenum</i>		Our test: Hela: no cytotoxicity; RD: no cytotoxicity; Hep-2: no cytotoxicity; A549: no cytotoxicity.
Metyl <i>p</i> -hydroxy phenyl acetate	Gorgonian-derivd fungi <i>Penicillium purpurogenum</i>		Our test: Hela: no cytotoxicity; RD: no cytotoxicity; Hep-2: no cytotoxicity; A549: no cytotoxicity.
3-Methoxy phenol	Gorgonian-derivd fungi <i>Penicillium purpurogenum</i>		Our test: Hela: no cytotoxicity; RD: no cytotoxicity; Hep-2: no cytotoxicity;

A549: no cytotoxicity.

Penicillixanthone A

Gorgonian-derived fungi
Talaromyces stipitatus

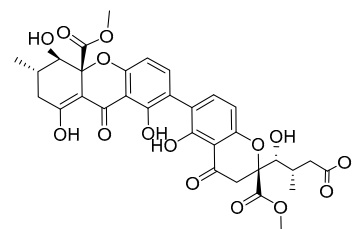


Our test:

K562: $IC_{50} > 10 \mu M$;
Vero: $IC_{50} > 10 \mu M$.

Versixanthone F

Gorgonian-derived fungi
Talaromyces stipitatus

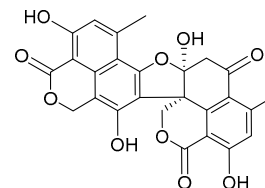


Ref. [5]:

A549: $IC_{50} = 10.6 \mu M$;
HO9810: $IC_{50} = 20.8 \mu M$.

Bacillosporin C

Gorgonian-derived fungi
Talaromyces stipitatus

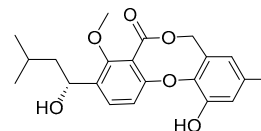


Our test:

HepG2: $IC_{50} > 10 \mu M$;
HCT-116: $IC_{50} > 10 \mu M$;
HL-60: $IC_{50} > 10 \mu M$;
A549: $IC_{50} > 10 \mu M$.

Vermixocin A

Gorgonian-derived fungi
Talaromyces stipitatus

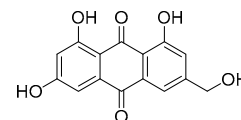


Ref. [6]:

P388: no cytotoxicity at 25 $\mu g/ml$.

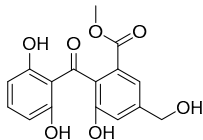
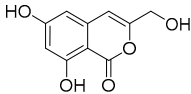
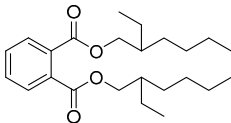
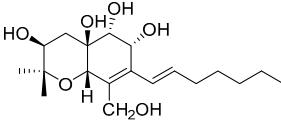
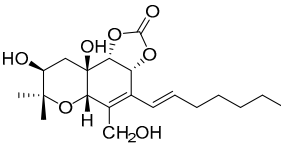
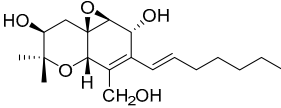
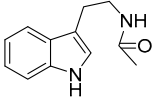
ω -Hydroxyemodin

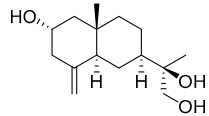
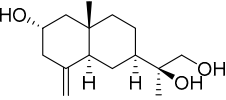
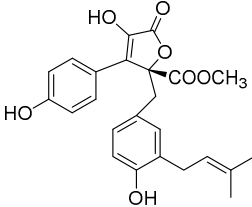
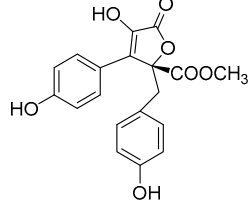
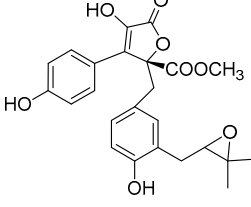
Gorgonian-derived fungi
Talaromyces stipitatus

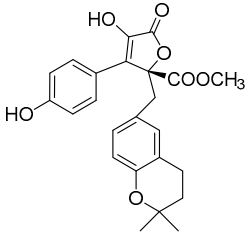
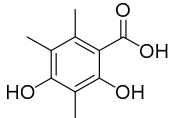
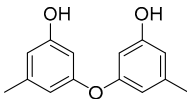
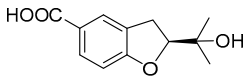
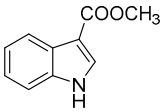
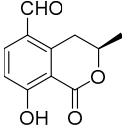


Ref. [7]:

MCF-7: $IC_{50} = 22 \mu g/ml$;
NCI-H187: $IC_{50} = 39 \mu g/ml$;
Vero: $IC_{50} > 50 \mu g/ml$.

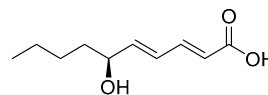
2-(2,6-Dihydroxybenzoyl)-3-hydroxy-5-hydroxymethylbenzoic acid methyl ester	Gorgonian-derived fungi <i>Talaromyces stipitatus</i>		Our test: K562: no cytotoxicity; Hela: IC ₅₀ > 10 μM; HCT-116: IC ₅₀ > 10 μM; A549: IC ₅₀ > 10 μM.
3-Hydroxymethyl-6,8-dihydroxyisocoumarin	Gorgonian-derived fungi <i>Talaromyces stipitatus</i>		Our test: Hela: IC ₅₀ > 10 μM; Hep-2: IC ₅₀ > 10 μM; A549: IC ₅₀ > 10 μM; RD: IC ₅₀ > 10 μM.
Di-(2-ethyl)-hexylphthalate	Gorgonian-derived fungi <i>Talaromyces stipitatus</i>		Ref. [8]: NCI-H460: no cytotoxicity; MCF-7: no cytotoxicity; HepG2: no cytotoxicity; SF268: no cytotoxicity.
Cytosporin L	Gorgonian-derived fungi <i>Eutypella</i> sp.		Our test: K562: IC ₅₀ > 10 μM; MCF-7: IC ₅₀ > 10 μM; A549: IC ₅₀ > 10 μM; Vero: IC ₅₀ > 10 μM.
Cytosporin E	Gorgonian-derived fungi <i>Eutypella</i> sp.		Our test: K562: IC ₅₀ > 10 μM; MCF-7: IC ₅₀ > 10 μM; A549: IC ₅₀ > 10 μM; Vero: IC ₅₀ > 10 μM.
Cytosporin D	Gorgonian-derived fungi <i>Eutypella</i> sp.		Our test: K562: IC ₅₀ > 10 μM; MCF-7: IC ₅₀ > 10 μM; A549: IC ₅₀ > 10 μM; Vero: IC ₅₀ > 10 μM.
<i>N</i> -Acetyltryptamine	Gorgonian-derived fungi <i>Eutypella</i> sp.		Our test: K562: IC ₅₀ > 10 μM; MCF-7: IC ₅₀ > 10 μM; A549: IC ₅₀ > 10 μM;

(11 <i>R</i>)-2,11,12-Trihydroxy- β -selinene	Gorgonian-derived fungi <i>Eutypella</i> sp.		Vero: IC ₅₀ > 10 μ M. Our test: K562: IC ₅₀ > 10 μ M; MCF-7: IC ₅₀ > 10 μ M; A549: IC ₅₀ > 10 μ M; Vero: IC ₅₀ > 10 μ M.
(11 <i>S</i>)-2,11,13-Trihydroxy- β -selinene	Gorgonian-derived fungi <i>Eutypella</i> sp.		Our test: K562: IC ₅₀ > 10 μ M; MCF-7: IC ₅₀ > 10 μ M; A549: IC ₅₀ > 10 μ M; Vero: IC ₅₀ > 10 μ M.
Butyrolactone I	Gorgonian-derived fungi <i>Eutypella</i> sp.		Ref. [9]: MDA-MB-231: IC ₅₀ = 34.4 μ M; MCF-7: IC ₅₀ = 17.4 μ M.
Butyrolactone II	Gorgonian-derived fungi <i>Eutypella</i> sp.		Ref. [10]: HL-60: IC ₅₀ > 80 μ M; ASPC1: IC ₅₀ > 80 μ M; PC-3: IC ₅₀ > 80 μ M; HCT-116: IC ₅₀ > 80 μ M.
Butyrolactone III	Gorgonian-derived fungi <i>Eutypella</i> sp.		Ref. [10]: HL-60: IC ₅₀ > 80 μ M; ASPC1: IC ₅₀ > 80 μ M; PC-3: IC ₅₀ > 80 μ M; HCT-116: IC ₅₀ > 80 μ M.

Butyrolactone V	Gorgonian-derived fungi <i>Eutypella</i> sp.		Ref. [9]: MDA-MB-231: IC ₅₀ = 22.2 μM; MCF-7: IC ₅₀ = 31.9 μM.
2,4-Dihydroxy-3,5,6-trimethylbenzoic acid	Gorgonian-derived fungi <i>Eutypella</i> sp.		Ref. [11]: HL-60: IC ₅₀ > 160 μM; HepG2: IC ₅₀ > 160 μM.
Diorcinol	Gorgonian-derived fungi <i>Eutypella</i> sp.		Ref. [12]: SK-MEL-28: IC ₅₀ = 40 μM; HCT-116: IC ₅₀ = 22.8 μM.
Anodendroic acid	Gorgonian-derived fungi <i>Xylaria</i> sp.		Ref [13]: Hela: no cytotoxicity; Hep-2: no cytotoxicity; RD: no cytotoxicity; A549: no cytotoxicity.
Methyl indole-3-carboxylate	Gorgonian-derived fungi <i>Xylaria</i> sp.		Ref [13]: Hela: no cytotoxicity; Hep-2: no cytotoxicity; RD: no cytotoxicity; A549: no cytotoxicity.
5-Formylmellein	Gorgonian-derived fungi <i>Eutypella</i> sp.		Ref [14]: NUGC-3: no cytotoxicity; HONE-1: no cytotoxicity.

(2*E*,4*E*,6*S*)-6-Hydroxydeca-2,4-dienoic acid

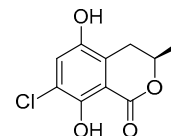
Gorgonian-derived fungi
Eutypella sp.



Ref [13]:
Hela: no cytotoxicity;
Hep-2: no cytotoxicity;
RD: no cytotoxicity;
A549: no cytotoxicity.

7-Chloro-5-hydroxymellein

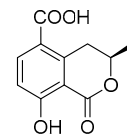
Gorgonian-derived fungi *Xylaria*
sp.



Ref [13]:
Hela: no cytotoxicity;
Hep-2: no cytotoxicity;
RD: no cytotoxicity;
A549: no cytotoxicity.

5-Carboxymellein

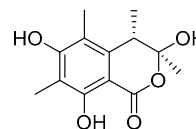
Gorgonian-derived fungi *Xylaria*
sp.



Ref [13]:
Hela: no cytotoxicity;
Hep-2: no cytotoxicity;
RD: no cytotoxicity;
A549: no cytotoxicity.

Sclerotinin A

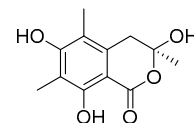
Gorgonian-derived fungi
Eutypella sp.



Ref [15]:
L5178Y: IC₅₀ > 10 µg/ml.

Sclerotinin B

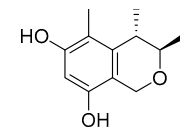
Gorgonian-derived fungi
Eutypella sp.



Ref [15]:
L5178Y: IC₅₀ > 10 µg/ml.

Decarboxydihydrocitrinin

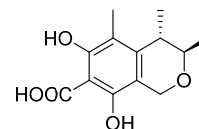
Gorgonian-derived fungi *Xylaria*
sp.



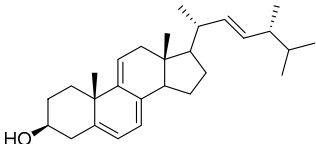
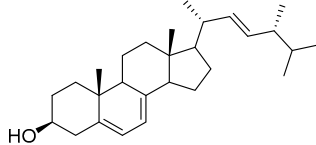
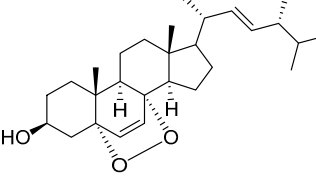
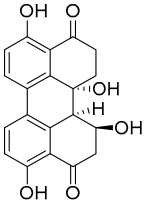
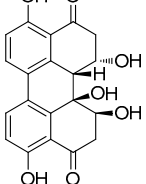
Ref [16]:
KB: no cytotoxicity;
MCF-7: no cytotoxicity;
Vero: no cytotoxicity.

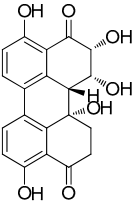
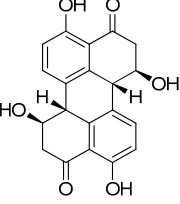
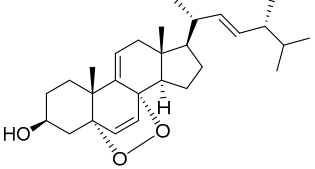
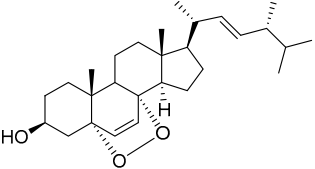
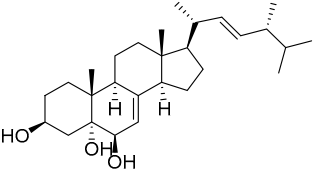
Dihydrocitrinin

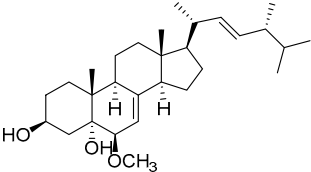
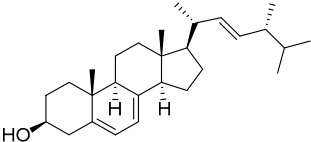
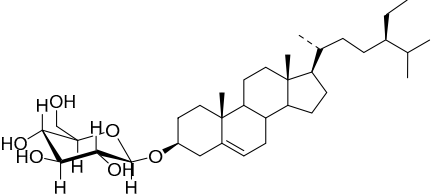
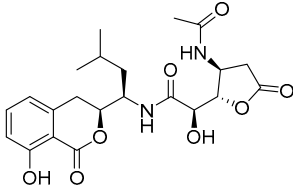
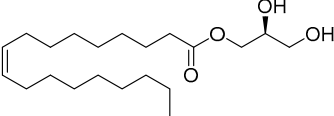
Gorgonian-derived fungi *Xylaria*
sp.

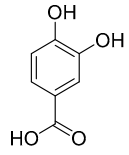
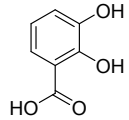
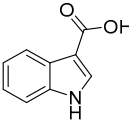
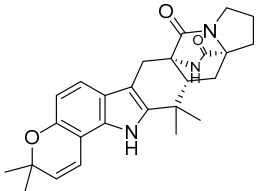
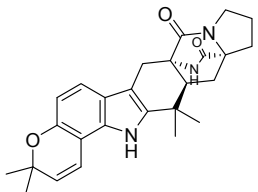
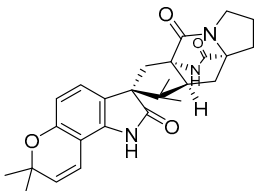


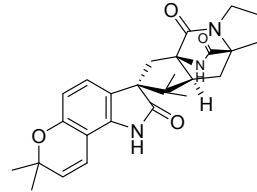
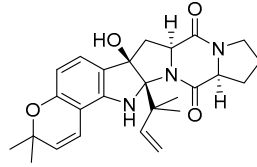
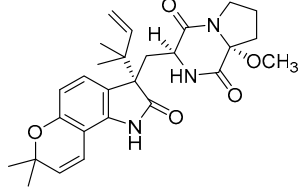
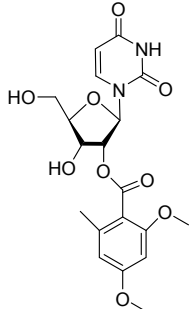
Ref [16]:
KB: no cytotoxicity;
MCF-7: no cytotoxicity;
Vero: no cytotoxicity.

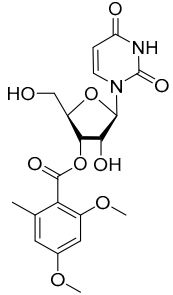
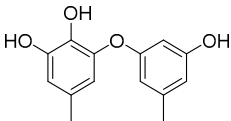
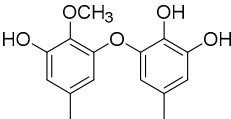
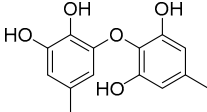
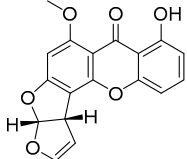
(22 <i>E</i>)-Ergosta-5,7,9(11)22-tetraen-3β-ol	Gorgonian-derived fungi <i>Xylaria</i> sp.		Our test: Hela: no cytotoxicity; Hep-2: no cytotoxicity; RD: no cytotoxicity; A549: no cytotoxicity.
Ergosta-5,7,22-triene-3β-ol	Gorgonian-derived fungi <i>Xylaria</i> sp.		Ref [17]: MCF-7: IC ₅₀ > 50 μg/ml; SF-268: IC ₅₀ > 50 μg/ml; NCI-H460: IC ₅₀ > 50 μg/ml.
5α,8α-Epidioxy-ergosta-6,22 <i>E</i> -dien-3β-ol	Gorgonian-derived fungi <i>Xylaria</i> sp.		Ref [13]: Hela: no cytotoxicity; Hep-2: no cytotoxicity; RD: no cytotoxicity; A549: no cytotoxicity.
Altertoxin I	Soft coral-derived fungi <i>Alternaria alternata</i>		Our test: HepG2: IC ₅₀ > 10 μM; HCT-116: IC ₅₀ > 10 μM; HL-60: IC ₅₀ > 10 μM; A549: IC ₅₀ > 10 μM.
6-epi-Stemphytriol	Soft coral-derived fungi <i>Alternaria alternata</i>		Our test: Hela: IC ₅₀ > 10 μM; HL-60: IC ₅₀ > 10 μM; K562: IC ₅₀ > 10 μM; A549: IC ₅₀ > 10 μM.

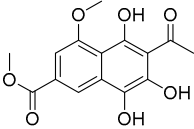
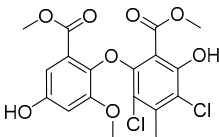
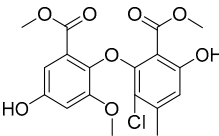
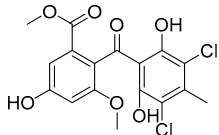
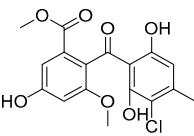
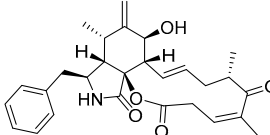
7-epi-8-Hydroxyaltertoxin I	Soft coral-derived fungi <i>Alternaria alternata</i>		<p>Our test:</p> <p>Hela: IC₅₀ > 10 μM; HL-60: IC₅₀ > 10 μM; K562: IC₅₀ > 10 μM; A549: IC₅₀ > 10 μM.</p>
Stemphyperlenol	Soft coral-derived fungi <i>Alternaria alternata</i>		<p>Ref [18]:</p> <p>KB: no cytotoxicity; KBv200: no cytotoxicity.</p>
5α,8α-Epidioxy-ergosta-6,9,22E-trien-3β-ol	Gorgonian-derived fungi <i>Cladosporium</i> sp.		<p>Our test:</p> <p>Hela: no cytotoxicity; RD: no cytotoxicity; Hep-2: no cytotoxicity; A549: no cytotoxicity.</p>
5α,8α-Epidioxy-ergosta-6,22E-dien-3β-ol	Gorgonian-derived fungi <i>Cladosporium</i> sp.		<p>Ref [13]:</p> <p>Hela: no cytotoxicity; Hep-2: no cytotoxicity; RD: no cytotoxicity; A549: no cytotoxicity.</p>
Ergosta-7,22-diene-3β,5α,6β-triol	Gorgonian-derived fungi <i>Cladosporium</i> sp.		<p>Our test:</p> <p>Hela: IC₅₀ > 10 μM; Hep-2: IC₅₀ > 10 μM; RD: IC₅₀ > 10 μM; A549: IC₅₀ > 10 μM; Vero: IC₅₀ > 10 μM.</p>

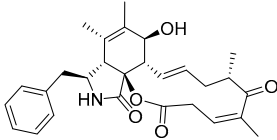
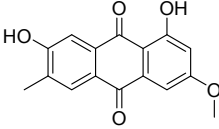
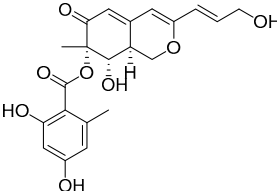
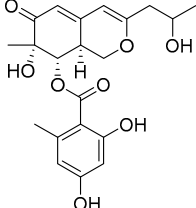
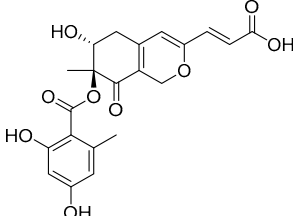
3β,5α-Dihydroxy-6β-methoxyergosta-7,22-diene	Gorgonian-derived fungi <i>Cladosporium</i> sp.		Ref [16]: SK-OV-3: IC ₅₀ > 30 μM; SK-MEL-2: IC ₅₀ > 30 μM; XF498: IC ₅₀ > 30 μM; HCT-115: IC ₅₀ > 30 μM; A549: IC ₅₀ > 30 μM.
Ergosterol	Gorgonian-derived fungi <i>Cladosporium</i> sp.		Ref [19]: SK-OV-3: IC ₅₀ = 12.03 μM; SK-MEL-2: IC ₅₀ = 12.36 μM; XF498: IC ₅₀ = 18.90 μM; HCT-115: IC ₅₀ = 16.04 μM; A549: IC ₅₀ = 23.11 μM.
β-Sitosterol glucoside	Gorgonian-derived fungi <i>Cladosporium</i> sp.		Ref [20]: HCT-116: IC ₅₀ = 8.52 μg/ml.
AI-77-C	Gorgonian-derived fungi <i>Cladosporium</i> sp.		Our test: HeLa: IC ₅₀ > 10 μM; Hep-2: IC ₅₀ > 10 μM; RD: IC ₅₀ > 10 μM; A549: IC ₅₀ > 10 μM.
9-Octadecenoic acid-2',3'-dihydroxy propyl ester	Gorgonian-derived fungi <i>Cladosporium</i> sp.		Our test: HeLa: no cytotoxicity; RD: no cytotoxicity; Hep-2: no cytotoxicity; A549: no cytotoxicity.

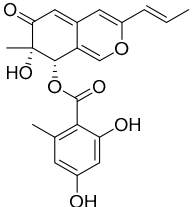
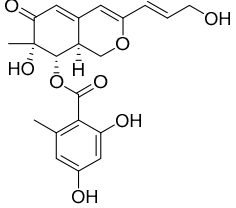
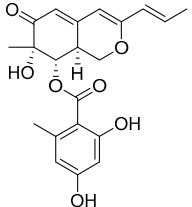
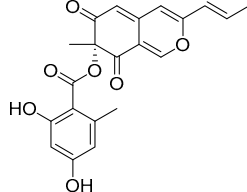
3,4-Dihydroxybenzoic acid	Gorgonian-derived fungi <i>Cladosporium</i> sp.		Ref [21]: HL-60: IC ₅₀ = 64.6 μM; Hel-299: IC ₅₀ > 100 μM.
2,3-Dihydroxybenzoic acid	Gorgonian-derived fungi <i>Cladosporium</i> sp.		Our test: Hela: no cytotoxicity; HL-60: no cytotoxicity;
Indole-3-carboxylic acid	Gorgonian-derived fungi <i>Cladosporium</i> sp.		Ref [22]: MCF-7: IC ₅₀ = 12.9 μm/ml.
6-epi-Stephacidin A	Gorgonian-derived fungi <i>Aspergillus versicolor</i>		Ref [23]: HL-60: no cytotoxicity; A549: no cytotoxicity.
Stephacidin A	Gorgonian-derived fungi <i>Aspergillus versicolor</i>		Ref [24]: Hela: no cytotoxicity.
Notoamide B	Gorgonian-derived fungi <i>Aspergillus versicolor</i>		Ref [25]: Hela: IC ₅₀ > 22 μg/ml; L1210: IC ₅₀ > 22 μg/ml.

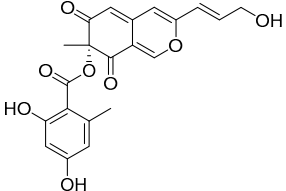
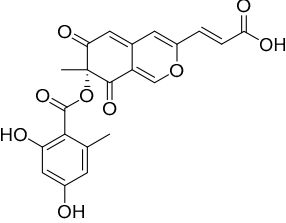
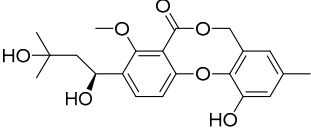
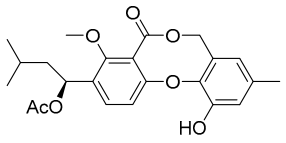
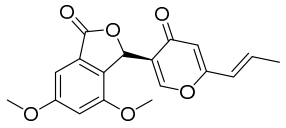
(-)-Versicolamide B	Gorgonian-derived fungi <i>Aspergillus versicolor</i>		Ref [23]: HL-60: no cytotoxicity; A549: no cytotoxicity.
Notoamide D	Gorgonian-derived fungi <i>Aspergillus versicolor</i>		Ref [25]: Hela: IC ₅₀ > 100 µg/ml; L1210: IC ₅₀ > 100 µg/ml.
Notoamide Q	Gorgonian-derived fungi <i>Aspergillus versicolor</i>		Ref [26]: K562: IC ₅₀ > 100 µM; ASPC: IC ₅₀ > 100 µM; H460: IC ₅₀ > 100 µM; A549: IC ₅₀ > 100 µM.
Kipukasin E	Gorgonian-derived fungi <i>Aspergillus versicolor</i>		Our test: K562: IC ₅₀ > 10 µM; Hela: IC ₅₀ > 10 µM; HCT-116: IC ₅₀ > 10 µM; A549: IC ₅₀ > 10 µM.

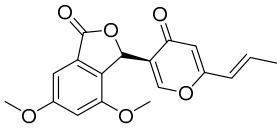
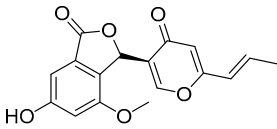
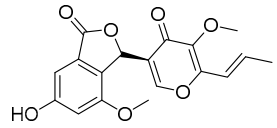
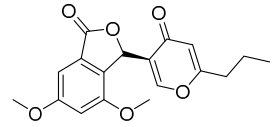
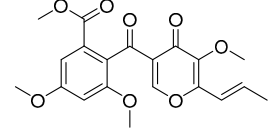
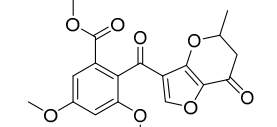
Kipukasin D	Gorgonian-derived fungi <i>Aspergillus versicolor</i>		Our test: K562: IC ₅₀ > 10 μM; Hela: IC ₅₀ > 100 μM; HCT-116: IC ₅₀ > 100 μM; A549: IC ₅₀ > 100 μM.
Cordyol C	Gorgonian-derived fungi <i>Aspergillus versicolor</i>		Ref [27]: K562: IC ₅₀ > 10 μM; HL-60: IC ₅₀ > 10 μM.
Diorecinol F	Gorgonian-derived fungi <i>Aspergillus versicolor</i>		Ref [28]: PC3: no cytotoxicity; A2780: no cytotoxicity; MDA-MB-231: no cytotoxicity; A549: no cytotoxicity.
Violaceol II	Gorgonian-derived fungi <i>Aspergillus versicolor</i>		Ref [29]: KB: IC ₅₀ > 10 μm/ml; BC: IC ₅₀ = 5.50 μm/ml; NCI-H187: IC ₅₀ = 3.70 μm/ml.
Sterigmatocystin	Gorgonian-derived fungi <i>Aspergillus versicolor</i>		Ref [30]: L-929: IC ₅₀ = 163.3 μM; Neuro-2a: IC ₅₀ = 40.1 μM; HepG2: IC ₅₀ = 286.1 μM.

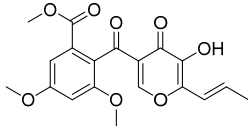
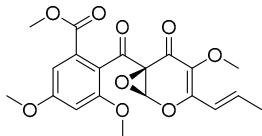
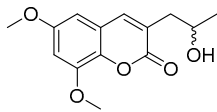
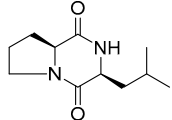
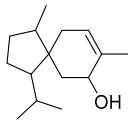
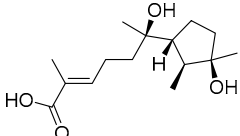
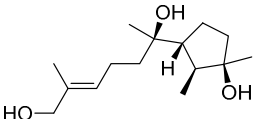
Methyl 6-acetyl-4-methoxy-5,7,8-trihydroxynaphthalene-2-carboxylate	Gorgonian-derived fungi <i>Aspergillus micronesiensis</i>		Ref [31]: K562: no cytotoxicity; Hun-7: no cytotoxicity; A549: no cytotoxicity.
3,5-Dichloroaosterric acid	Gorgonian-derived fungi <i>Aspergillus micronesiensis</i>		Our test: Hela: IC ₅₀ > 10 μM; A549: IC ₅₀ > 10 μM.
Penicillither	Gorgonian-derived fungi <i>Aspergillus micronesiensis</i>		Ref [31]: KB: no cytotoxicity; MCF-7: no cytotoxicity; Vero: no cytotoxicity.
Dihydrogeodin	Gorgonian-derived fungi <i>Aspergillus micronesiensis</i>		Ref [32]: KB: no cytotoxicity; MCF-7: no cytotoxicity; Vero: no cytotoxicity.
2-(3-Chloro-4-methyl-γ-resorcyloyl)-5-hydroxy- <i>m</i> -anisic acid methyl ester	Gorgonian-derived fungi <i>Aspergillus micronesiensis</i>		Ref [32]: KB: no cytotoxicity; MCF-7: no cytotoxicity; Vero: no cytotoxicity.
Cytochalasin Z16	Gorgonian-derived fungi <i>Aspergillus micronesiensis</i>		Ref [33]: HL-60: no cytotoxicity; BEL-7402: no cytotoxicity; P388: no cytotoxicity.

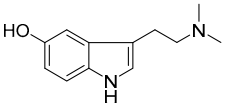
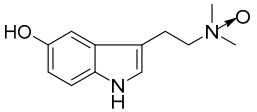
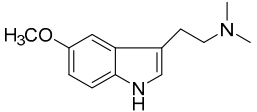
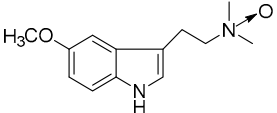
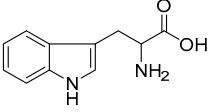
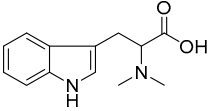
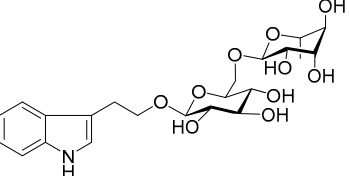
Cytochalasin Z17	Gorgonian-derived fungi <i>Aspergillus micronesiensis</i>		Ref [33]: HL-60: no cytotoxicity; BEL-7402: no cytotoxicity; P388: no cytotoxicity.
9,10-Anthracenedione	Gorgonian-derived fungi <i>Aspergillus micronesiensis</i>		Our test: L1210: IC ₅₀ > 100 μM; A549: IC ₅₀ > 100 μM.
Pinophilin D	Gorgonian-derived fungi <i>Penicillium pinophilum</i>		Ref [34]: Hep-2: no cytotoxicity; RD: no cytotoxicity; Hela: no cytotoxicity.
Pinophilin E	Gorgonian-derived fungi <i>Penicillium pinophilum</i>		Ref [34]: Hep-2: no cytotoxicity; RD: no cytotoxicity; Hela: no cytotoxicity.
Pinophilin F	Gorgonian-derived fungi <i>Penicillium pinophilum</i>		Ref [34]: Hep-2: no cytotoxicity; RD: no cytotoxicity; Hela: no cytotoxicity.

Sch 1385568	Gorgonian-derived fungi <i>Penicillium pinophilum</i>		Ref [34]: Hep-2: no cytotoxicity; RD: no cytotoxicity; Hela: no cytotoxicity.
Pinophilin B	Gorgonian-derived fungi <i>Penicillium pinophilum</i>		Ref [34]: Hep-2: no cytotoxicity; RD: no cytotoxicity; Hela: no cytotoxicity.
Sch 725680	Gorgonian-derived fungi <i>Penicillium pinophilum</i>		Ref [34]: Hep-2: no cytotoxicity; RD: no cytotoxicity; Hela: no cytotoxicity.
(-)-Mitorubrin	Gorgonian-derived fungi <i>Penicillium pinophilum</i>		Ref [34]: Hep-2: no cytotoxicity; RD: no cytotoxicity; Hela: no cytotoxicity.

(-)-Mitorubrinol	Gorgonian-derived fungi <i>Penicillium pinophilum</i>		Ref [34]: Hep-2: no cytotoxicity; RD: no cytotoxicity; Hela: no cytotoxicity.
(-)-Mitorubrinic acid	Gorgonian-derived fungi <i>Penicillium pinophilum</i>		Ref [34]: Hep-2: no cytotoxicity; RD: no cytotoxicity; Hela: no cytotoxicity.
Isopenicillide	Gorgonian-derived fungi <i>Penicillium pinophilum</i>		Ref [34]: Hep-2: no cytotoxicity; RD: no cytotoxicity; Hela: no cytotoxicity.
Purpactin A	Gorgonian-derived fungi <i>Penicillium pinophilum</i>		Ref [34]: Hep-2: no cytotoxicity; RD: no cytotoxicity; Hela: no cytotoxicity.
Vermistatin	Gorgonian-derived fungi <i>Penicillium pinophilum</i>		Ref [35]: KB: IC ₅₀ = 90.2 μm/ml; KBv200: no cytotoxicity.

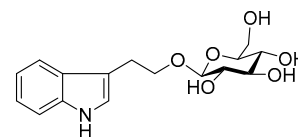
Methoxyvermistatin	Gorgonian-derived fungi <i>Penicillium pinophilum</i>		Ref [35]: KB: IC ₅₀ = 20.0 μm/ml; KBv200: IC ₅₀ = 15.1 μm/ml
4-Demethylvermistatin	Gorgonian-derived fungi <i>Penicillium pinophilum</i>		Our test: Hela: no cytotoxicity; Hep-2: no cytotoxicity; A549: no cytotoxicity; RD: no cytotoxicity.
4-Demethyl-11-methoxyvermistatin	Gorgonian-derived fungi <i>Penicillium pinophilum</i>		Our test: Hela: no cytotoxicity; Hep-2: no cytotoxicity; A549: no cytotoxicity; RD: no cytotoxicity.
Dihydrovermistatin	Gorgonian-derived fungi <i>Penicillium pinophilum</i>		Our test: Hela: no cytotoxicity; Hep-2: no cytotoxicity; A549: no cytotoxicity; RD: no cytotoxicity.
3-O-Methylfunicone	Gorgonian-derived fungi <i>Penicillium pinophilum</i>		Ref [36]: KB: IC ₅₀ = 35.3 μM.
Penifupyrone	Gorgonian-derived fungi <i>Penicillium pinophilum</i>		Ref [36]: KB: IC ₅₀ = 4.7 μM.

Funicone	Gorgonian-derived fungi <i>Penicillium pinophilum</i>		Ref [36]: KB: IC ₅₀ = 13.2 μM.
3-O-Methyl-5,6-epoxyfunicone	Gorgonian-derived fungi <i>Penicillium pinophilum</i>		Our test: Hela: no cytotoxicity; Hep-2: no cytotoxicity; A549: no cytotoxicity; RD: no cytotoxicity.
Pestalsin A	Gorgonian-derived fungi <i>Penicillium pinophilum</i>		Ref [37]: L5178Y: no cytotoxicity; Hela: no cytotoxicity; PC12: no cytotoxicity.
Cyclo(L-Leu-L-Pro)	Soft coral-derived fungi <i>Trichoderma harzianum</i>		Ref [38]: Hep-2: IC ₅₀ = 242 mg/l.
Trichoacorenol	Soft coral-derived fungi <i>Trichoderma harzianum</i>		Our test: MCF-7: no cytotoxicity; HepG2: no cytotoxicity; A549: no cytotoxicity; HCT-116: no cytotoxicity.
Ascotrichic acid	Soft coral-derived fungi <i>Trichoderma harzianum</i>		Our test: MCF-7: no cytotoxicity; HepG2: no cytotoxicity; A549: no cytotoxicity; HCT-116: no cytotoxicity.
Cyclonerotriol	Soft coral-derived fungi <i>Trichoderma harzianum</i>		Our test: MCF-7: no cytotoxicity; HepG2: no cytotoxicity; A549: no cytotoxicity; HCT-116: no cytotoxicity.

5-Hydroxy- <i>N,N</i> -dimethyltryptamine	<i>Phylloodium pulchellum</i>		Ref [39]: KB: IC ₅₀ > 100 mg/l; HepG2: IC ₅₀ > 100 mg/l .
5-Hydroxy- <i>N,N</i> -dimethyltryptamine-oxide	<i>Phylloodium pulchellum</i>		Our test: Hela: IC ₅₀ > 10 μM; Hep-2: IC ₅₀ > 10 μM; A549: IC ₅₀ > 10 μM; RD: IC ₅₀ > 10 μM.
5-Methoxy- <i>N,N</i> -dimethyltryptamine	<i>Phylloodium pulchellum</i>		Ref [39]: KB: IC ₅₀ > 100 mg/l; HepG2: IC ₅₀ = 80.5 mg/l .
5-Methoxy- <i>N,N</i> -dimethyltryptamine-oxide	<i>Phylloodium pulchellum</i>		Our test: Hela: IC ₅₀ > 10 μM; Hep-2: IC ₅₀ > 10 μM; A549: IC ₅₀ > 10 μM; RD: IC ₅₀ > 10 μM.
L-Tryptophan	<i>Phylloodium pulchellum</i>		Our test: Hela: IC ₅₀ > 10 μM; Hep-2: IC ₅₀ > 10 μM; A549: IC ₅₀ > 10 μM; RD: IC ₅₀ > 10 μM.
<i>N,N</i> -Dimethyl-L-tryptophan	<i>Phylloodium pulchellum</i>		Our test: Hela: IC ₅₀ > 10 μM; Hep-2: IC ₅₀ > 10 μM; A549: IC ₅₀ > 10 μM; RD: IC ₅₀ > 10 μM.
2-(Indol-3-yl)ethyl-α-L-rhamnopyra-nosyl-(1→6)-β-D-glu copyranoside	<i>Phylloodium pulchellum</i>		Our test: Hela: IC ₅₀ > 10 μM; Hep-2: IC ₅₀ > 10 μM; A549: IC ₅₀ > 10 μM; RD: IC ₅₀ > 10 μM.

2-(Indol-3-yl)ethyl-β-D-glucopyranoside

Phyllodium pulchellum

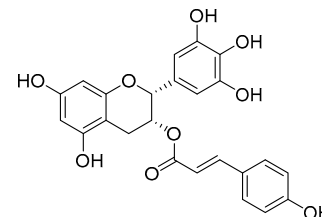


Our test:

Hela: IC₅₀ > 10 μM;
Hep-2: IC₅₀ > 10 μM;
A549: IC₅₀ > 10 μM;
RD: IC₅₀ > 10 μM.

(-)-Epigallocatechin 3-O-(E)-p-coumaroate

Phyllodium pulchellum

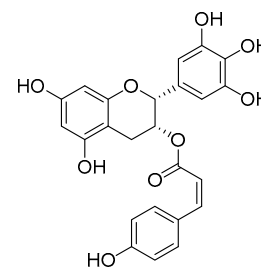


Our test:

Hela: IC₅₀ > 10 μM;
Hep-2: IC₅₀ > 10 μM;
A549: IC₅₀ > 10 μM;
RD: IC₅₀ > 10 μM.

(-)-Epigallocatechin 3-O-(Z)-p-coumaroate

Phyllodium pulchellum

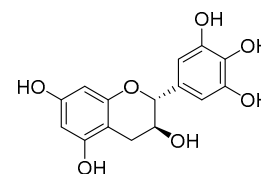


Our test:

Hela: IC₅₀ > 10 μM;
Hep-2: IC₅₀ > 10 μM;
A549: IC₅₀ > 10 μM;
RD: IC₅₀ > 10 μM.

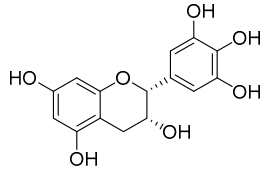
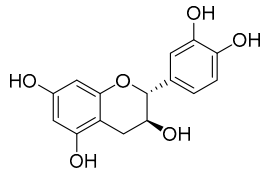
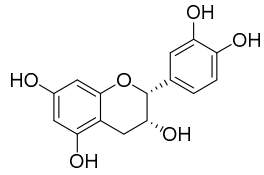
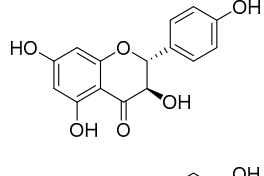
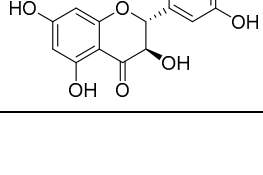
(-)-Gallocatechin

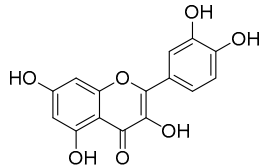
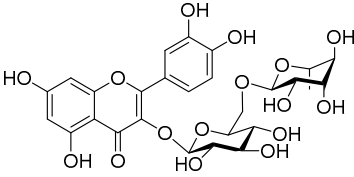
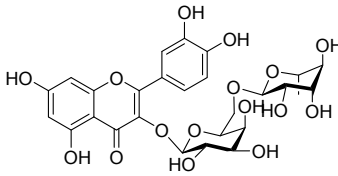
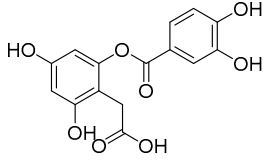
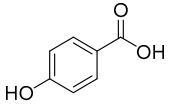
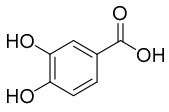
Phyllodium pulchellum

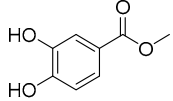
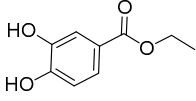
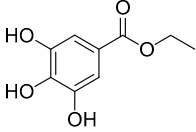
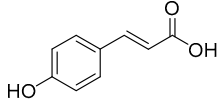
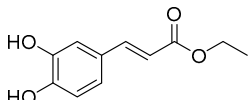
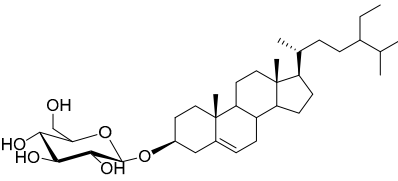
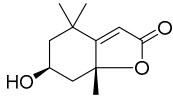


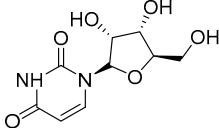
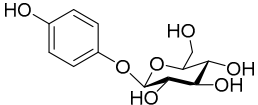
Our test:

Hela: IC₅₀ > 10 μM;
Hep-2: IC₅₀ > 10 μM;
A549: IC₅₀ > 10 μM;
RD: IC₅₀ > 10 μM.

(-)-Epigallocatechin	<i>Phyllodium pulchellum</i>		Ref [40]: HSC-2: IC ₅₀ = 67 μM.
(+)-Catechin	<i>Phyllodium pulchellum</i>		Ref [40]: HSC-2: IC ₅₀ = 497 μM.
(-)-Epicatechin	<i>Phyllodium pulchellum</i>		Ref [40]: HSC-2: IC ₅₀ > 500 μM.
(+)-Dihydrokaempferol	<i>Phyllodium pulchellum</i>		Ref [41]: A-549: no cytotoxicity; BEL-7402: no cytotoxicity; HCT-8: no cytotoxicity; A2780: no cytotoxicity; BGC-823: no cytotoxicity.
Dihydroquercetin	<i>Phyllodium pulchellum</i>		Ref [42]: HCT-116: IC ₅₀ = 63.42 μM.

Quercetin	<i>Phyllodium pulchellum</i>		Ref [43]: HT-29: IC ₅₀ > 30 μM; Caco-2: IC ₅₀ > 15 μM.
Rutin	<i>Phyllodium pulchellum</i>		Ref [44]: SW480: IC ₅₀ = 125 μM.
Quercetin-3-O-α-L-rhamnopyranosyl-(1→6)-β-D-galactopyranoside	<i>Phyllodium pulchellum</i>		Our test: Hela: IC ₅₀ > 10 μM; Hep-2: IC ₅₀ > 10 μM; A549: IC ₅₀ > 10 μM; RD: IC ₅₀ > 10 μM.
2-O-(3,4-Dihydroxybenzoyl)-2,4,6-trihydroxyphenylacetic acid	<i>Phyllodium pulchellum</i>		Our test: Hela: IC ₅₀ > 100 μM; Hep-2: IC ₅₀ > 100 μM; A549: IC ₅₀ > 100 μM; RD: IC ₅₀ > 100 μM.
<i>p</i> -Hydroxybenzoic acid	<i>Phyllodium pulchellum</i>		Ref [45]: HepG2: no cytotoxicity; Hep-3B: no cytotoxicity; MCF-7: no cytotoxicity; MDA-MB-231: no cytotoxicity; A-549: no cytotoxicity.
Protocatechuic acid	<i>Phyllodium pulchellum</i>		Ref [46]: HL-60: IC ₅₀ = 4.54 mM.

Protocaechuic acid methyl ester	<i>Phyllodium pulchellum</i>		Our test: Hela: IC ₅₀ > 10 μM; Hep-2: IC ₅₀ > 10 μM; A549: IC ₅₀ > 10 μM; RD: IC ₅₀ > 10 μM.
Protocatechuic acid ethyl ester	<i>Phyllodium pulchellum</i>		Our test: Hela: IC ₅₀ > 10 μM; Hep-2: IC ₅₀ > 10 μM; A549: IC ₅₀ > 10 μM; RD: IC ₅₀ > 10 μM.
Ethyl gallate	<i>Phyllodium pulchellum</i>		Ref [47]: Vero: IC ₅₀ > 100 μg/ml; Hela: IC ₅₀ > 72 μg/ml.
<i>p</i> -Coumaric acid	<i>Phyllodium pulchellum</i>		Our test: Hela: IC ₅₀ > 10 μM; Hep-2: IC ₅₀ > 10 μM; A549: IC ₅₀ > 10 μM; RD: IC ₅₀ > 10 μM.
Caffeic acid ester	<i>Phyllodium pulchellum</i>		Our test: Hela: IC ₅₀ > 10 μM; Hep-2: IC ₅₀ > 10 μM; A549: IC ₅₀ > 10 μM; RD: IC ₅₀ > 10 μM.
Daucosterol	<i>Phyllodium pulchellum</i>		Our test: Hela: IC ₅₀ > 10 μM; Hep-2: IC ₅₀ > 10 μM; A549: IC ₅₀ > 10 μM; RD: IC ₅₀ > 10 μM.
Loliolide	<i>Phyllodium pulchellum</i>		Ref [48]: HL-60: IC ₅₀ > 100 μM; A-549: IC ₅₀ > 100 μM; SK-BR3: IC ₅₀ > 100 μM.

Uridine	<i>Phylloodium pulchellum</i>		Our test: Hela: IC ₅₀ > 10 μM; Hep-2: IC ₅₀ > 10 μM; A549: IC ₅₀ > 10 μM; RD: IC ₅₀ > 10 μM.
Arbutin	<i>Phylloodium pulchellum</i>		Our test: Hela: IC ₅₀ > 10 μM; Hep-2: IC ₅₀ > 10 μM; A549: IC ₅₀ > 10 μM; RD: IC ₅₀ > 10 μM.

^a the cytotoxicity data of the 138 compounds derived from coral-derived fungi and plants.

HL-60 = promyelocytic leukemia cell line; K562 = chronic leukemia cell line; A549 = lung carcinoma cell line; CF-1: = spruce budworm cell line; HCT-8 = human colon carcinoma cell line; MDA-MB-435 = human breast cancer cell line; SF-295 = human glioblastoma cell line; Hela = human carcinoma cell line; RD = rhabdomyosarcoma cell line; Hep-2 = epidermoid carcinoma cell line; L5178Y = mouse lymphoma cell line; HepG2 = human hepatoma cell line; HCT-116 = human colon carcinoma cell line; P388 = mouse leukemia cell line; MCF-7 = human breast cancer cell line; NCI-H187 = human small-cell lung cancer cell line; Vero = african green monkey kidney fibroblasts; MDA-MB-231 = human breast cancer cell line; ASPC1 = pancreatic cancer cell line; PC-3 = prostate cancer cell line; SK-MEL-28 = human melanoma cell line; NUGC-3 = human gastric carcinoma cell line; HONE-1 = human nasopharyngeal carcinoma cell line; KB = human oral epidermoid carcinoma cell line; SF-268 = human glioblastoma cell line; NCI-H460 = human small-cell lung cancer cell line; SK-OV-3 = human ovarian cancer cell line; SK-MEL-2 = skin melanoma cell line; XF498 = human CNS tumor cell line; HCT-115 = human colon carcinoma cell line; Hel-299 = human embryonic lung cell line; L1210 = murine leukemia cell line; ASPC = human pancreatic tumor cell line; H460 = human lung cancer cell line; PC3 = prostate cancer cell line; A2780 = human ovarian carcinoma cell line; BC = human breast cancer cell line; L-929 = murine fibroblasts; Neuro-2a = neuronal cell line; Huh-7: human hepatoma cell line; BEL-7402 = human hepatocellular carcinoma cell line; KBv200 = human multidrug-resistant cell line; PC12 = rat pheochromocytoma cell line; HSC-2 = human oral tumor cell line; BGC-823 = stomach cancer cell line; HT-29 = human colon carcinoma cell line; Caco-2 = human colon carcinoma cell line; SW480 = human colon carcinoma cell line; Hep-3B = human hepatoma cell line.

References

1. Qi, J., Shao, C.L., Li, Z.Y., Gan, L.S., Fu, X.M., Bian, W.T., Zhao, H.Y., Wang, C.Y. Isocoumarin derivatives and benzofurans from a sponge-derived *penicillium* sp. fungus. *J. Nat. Prod.* **2013**, *76*, 571–579.
2. Findlay, J.A., Li, G.Q., Miller, J.D., Womiloju, T.O. Insect toxins from *spruce endophytes*. *Can. J. chem.* **2003**, *81*, 284–292.
3. Gallo, M.B.C., Chagas, F.O., Almeida, M.O., Macedo, C.C., Cavalcanti, B.C., Barros, F.W.A., Moraes, M.O.D., Costa-Lotufo, L.V., Pessoa, C., Bastos, J.K., Pupo, M.T. *Endophytic* fungi found in association with *smallanthus sonchifolius* (asteraceae) as resourceful producers of cytotoxic bioactive natural products. *J. Basic Microb.* **2009**, *49*, 142–151.
4. Damour, H., Okoye, F.B.C., Proksch, P., Hakiki, A., Mosaddak, M., Hegazy, M.F., Debbab, A. Pretrichodermamide A and Nafuredin from *Trichoderma* sp, an endophyte of *Cola Nitida*. *J. Mater. Environ. Sci.* **2015**, *6*, 779–783.

5. Wu, G.W., Yu, G.H., Kurtán, T., Mándi, A., Peng, J.X., Mo, X.M., Liu, M., Li, H., Sun, X.H., Li, J., Zhu, T.J., Gu, Q.Q., Li, D.H. Versixanthonones A–F, cytotoxic xanthone-chromanone dimers from the marine-derived fungus *Aspergillus versicolor* HDN1009. *J. Nat. Prod.* **2015**, *78*, 2691–2698.
6. Proksa, B., Uhrin, D., Adamcová, J., Fуска, J. Vermixocins A and B, two novel metabolites from *Penicillium vermiculatum*. *J. Antibiot.* **1992**, *45*, 1268–1272.
7. Isaka, M., Chinthanom, P., Veeranondha, S., Supothina, S., Luangsa-ard, J. J. Novel cyclopropyl diketones and 14-membered macrolides from the soil fungus *Hamigera avellanea* BCC 17816. *Tetrahedron* **2008**, *64*, 11028–11033.
8. Wang, M., Chen, Y.C., L. H.H., Sun, Z.H., Tan, G.H., Yan, H.J., Zhang, W.M., Guo, X.L., Study on secondary metabolites of endophytic fungus *bipolaris sorokiniana* from *pogostemon cablin* and their antitumor activities. *J. Guangdong Pharm. Univ.* **2015**, *31*, 576–580.
9. Silva, I.P.D., Brissow, E., Kellner Filho, L.C., Senabio, J., Siqueira, K.A.D., Filho, S.V., Damasceno, J.L., Mendes, S.A., Tavares, D.C., Magalhães, L.G., Junior, P.A.S., Januário, A.H., Soares, M.A. Bioactive compounds of *Aspergillus terreus*-F7, an endophytic fungus from *Hyptis suaveolens* (L.) Poit. *World J. Microb. Biot.* **2017**, *33*, 62.
10. An, X., Pei, Y.H., Chen, S.F., Li, S.G., Hu, X.L., Chen, G., Lin, B., Wang, H.F. Three New Butenolides from the Fungus *Aspergillus* sp. CBS-P-2. *Molecules* **2016**, *21*, 1361.
11. Wang, L., Qin, D., Zhang, K., Huang, Q., Liu, S., Han, M.J., Dong, J.Y. Metabolites from the co-culture of nigranoic acid and *Umbelopsis dimorpha* SWUKD3. 1410, an endophytic fungus from *Kadsura angustifolia*. *Nat. Prod. Res.* **2017**, *31*, 1414–1421.
12. Zhuravleva, O.I., Afiyatullo, S.S., Vishchuk, O.S., Denisenko, V.A., Slinkina, N.N., Smetanina, O.F. Decumbenone C, a new cytotoxic decaline derivative from the marine fungus *Aspergillus sulphureus* KMM 4640. *Arch. Pharm. Res.* **2012**, *35*, 1757–1762.
13. Sun, D.W., Cao, F., Liu, M., Guan, F.F., Wang, C.Y. New fatty acid from a gorgonian-derived *Xylaria* sp. fungus. *Chem. Nat. Compd.* **2017**, *53*, 227–230.
14. Lee, T.H., Chiou, J.L., Lee, C.K., Kuo, Y.H. Separation and determination of chemical constituents in the roots of *Rhus javanica* L. var. *roxburghiana*. *J. Chin. Chem. Soc.* **2005**, *52*, 833–841.
15. Lai, D.W., Brötz-Oesterhelt, H., Müller, W.E., Wray, V., Proksch, P. Bioactive polyketides and alkaloids from *Penicillium citrinum*, a fungal endophyte isolated from *Ocimum tenuiflorum*. *Fitoterapia* **2013**, *91*, 100–106.
16. Khamthong, N., Rukachaisirikul, V., Phongpaichit, S., Preedanon, S., Sakayaroj, J. Bioactive polyketides from the sea fan-derived fungus *Penicillium citrinum* PSU-F51. *Tetrahedron* **2012**, *68*, 8245–8250.
17. Zhang, Y.M., Li, H.Y., Hu, C., Sheng, H.F., Zhang, Y., Lin, B.R., Zhou, G.X. Ergosterols from the culture broth of marine *Streptomyces anandii* H41-59. *Mar. drugs* **2016**, *14*, 84.
18. Liu, F., Cai, X.L., Yang, H., Xia, X.K., Guo, Z.Y., Yuan, J., Li, M.F., She, Z.G., Lin, Y.C., The bioactive metabolites of the mangrove endophytic fungus *Talaromyces* sp. ZH-154 isolated from *Kandelia candel* (L.) Druce. *Planta Med.* **2010**, *76*, 185–189.
19. Kwon, H.C., Zee, S.D., Cho, S.Y., Choi, S.U., Lee, K.R. Cytotoxic ergosterols from *paecilomyces* sp. J300. *Arch. Pharm. Res.* **2002**, *25*, 851–855.
20. Salama, M.M., Kandil, Z.A., Islam, W.T. Cytotoxic compounds from the leaves of *Gaillardia aristata* Pursh. growing in Egypt. *Nat. Prod. Res.* **2012**, *26*, 2057–2062.

21. Hien, N.T.T., Nhiem, N.X., Yen, D.T.H., Hang, D.T.T., Tai, B.H., Quang, T.H., Anh, H.L.T., Kiem, P.V., Minh, C.V., Kim, E.J., Kim, S.H., Kang, H.K., Kim, Y.H. Chemical constituents of the *Annona glabra* fruit and their cytotoxic activity. *Pharm. Boil.* **2015**, *53*, 1602–1607.
22. Wu, P.L., Lin, F.W., Wu, T.S., Kuoh, C.S., Lee, K.H., Lee, S.J. Cytotoxic and anti-HIV principles from the rhizomes of *Begonia nantoensis*. *Chem. Pharm. Bull.* **2004**, *52*, 345–349.
23. Cai, S.X., Luan, Y.P., Kong, X.L., Zhu, T.J., Gu, Q.Q., Li, D.H. Isolation and photoinduced conversion of 6-epi-stephacidins from *Aspergillus taichungensis*. *Org. Lett.* **2013**, *15*, 2168–2171.
24. Tsukamoto, S., Kato, H., Samizo, M., Nojiri, Y., Onuki, H., Hirota, H., Ohta, T. Notoamides F–K, prenylated indole alkaloids isolated from a marine-derived *Aspergillus* sp. *J. Nat. Prod.* **2008**, *71*, 2064–2067.
25. Kato, H., Yoshida, T., Tokue, T., Nojiri, Y., Hirota, H., Ohta, T., Williams, R.M., Tsukamoto, S. Notoamides A–D: prenylated indole alkaloids isolated from a marine-derived fungus, *Aspergillus* sp. *Angew. Chem.* **2007**, *119*, 2304–2306.
26. Liu, L., Wang, L., Bao, L., Ren, J.W., Bahadur Basnet, B., Liu, R.X., He, L.W., Han, J.J., Yin, W.B., Liu, H. Versicoamides F–H, prenylated indole alkaloids from *Aspergillus tennesseeensis*. *Org. Lett.* **2017**, *19*, 942–945.
27. Chen, M., Shao, C.L., Fu, X.M., Xu, R.F., Zheng, J.J., Zhao, D.L., She, Z.G., Wang, C.Y. Bioactive indole alkaloids and phenyl ether derivatives from a marine-derived *Aspergillus* sp. fungus. *J. Nat. Prod.* **2013**, *76*, 547–553.
28. Li, X.B., Zhou, Y.H., Zhu, R.X., Chang, W.Q., Yuan, H.Q., Gao, W., Zhang, L.L., Zhao, Z.T., Lou, H.X. Identification and biological evaluation of secondary metabolites from the endolichenic fungus *Aspergillus versicolor*. *Chem. Biodiverse.* **2015**, *12*, 575–592.
29. Bunyapaiboonsri, T., Yoiprommarat, S., Intereya, K., Kocharin, K. New diphenyl ethers from the insect pathogenic fungus *Cordyceps* sp. BCC 1861. *Chem. Pharm. Bull.* **2007**, *55*, 304–307.
30. Bünger, J., Westphal, G., Mönnich, A., Hinnendahl, B., Hallier, E., Müller, M. Cytotoxicity of occupationally and environmentally relevant mycotoxins. *Toxicology*, **2004**, *202*, 199–211.
31. Chen, S.T., Wang, J.F., Wang, Z., Lin, X.P., Zhao, B.X., Kaliaperumal, K., Liao, C.J., Tu, Z.C., Li, J.L., Xu, S.H., Liu, Y.H. Structurally diverse secondary metabolites from a deep-sea-derived fungus *Penicillium chrysogenum* SCSIO 41001 and their biological evaluation. *Fitoterapia* **2017**, *117*, 71–78.
32. Rukachaisirikul, V., Satpradit, S., Klaiklay, S., Phongpaichit, S., Borwornwiriyan, K., Sakayaroj, J. Polyketide anthraquinone, diphenyl ether, and xanthone derivatives from the soil fungus *Penicillium* sp. PSU-RSPG99. *Tetrahedron* **2014**, *70*, 5148–5152.
33. Lin, Z.J., Zhang, G.J., Zhu, T.J., Liu, R., Wei, H.J., Gu, Q.Q. Bioactive cytochalasins from *Aspergillus flavipes*, an endophytic fungus associated with the mangrove plant *Acanthus ilicifolius*. *Helv. Chim. Acta.* **2009**, *92*, 1538–1544.
34. Zhao, D.L., Shao, C.L., Zhang, Q., Wang, K.L., Guan, F.F., Shi, T., Wang, C.Y. Azaphilone and diphenyl ether derivatives from a gorgonian-derived strain of the fungus *Penicillium pinophilum*. *J. Nat. Prod.* **2015**, *78*, 2310–2314.

35. Xia, X.K., Huang, H.R., She, Z.G., Cai, J.W., Lan, L., Zhang, J.Y., Fu, L.W., Vrijmoed, L.L.P., Lin, Y.C. Structural and biological properties of vermistatin and two new vermistatin derivatives isolated from the marine-mangrove endophytic fungus *Guignardia* sp. No. 4382. *Helv. Chim. Acta.* **2007**, *90*, 1925–1931.
36. Chen, M.J., Fu, Y.W., Zhou, Q.Y. Penifupyrone, a new cytotoxic funicone derivative from the endophytic fungus *Penicillium* sp. HSZ-43. *Nat. Prod. Res.* **2014**, *28*, 1544–1548.
37. Xu, J., Kjer, J., Sendker, J., Wray, V., Guan, H.S., Edrada, R., Müller, W.E.G., Lin, W.H., Wu, J., Proksch, P. Cytosporones, coumarins, and an alkaloid from the endophytic fungus *Pestalotiopsis* sp. isolated from the Chinese mangrove plant *Rhizophora mucronata*. *Bioorg. Med. Chem.* **2009**, *17*, 7362–7367.
38. Santos, O.C.S., Soares, A.R., Machado, F.L.S., Romanos, M.T.V., Muricy, G., Giambiagi-deMarval, M., Laport, M.S. Investigation of biotechnological potential of sponge-associated bacteria collected in Brazilian coast. *Lett. Appl. Microbiol.* **2015**, *60*, 140–147.
39. Gan, N., Yang, X., Li, T.H., He, P. Studies on constituents of roots and leaves from *Desmodium blandum* and their cytotoxic activity against growth of several tumor cells. *Zhongguo zhongyao zazhi* **2008**, *33*, 2077–2080.
40. Babich, H., Krupka, M.E., Nissim, H.A., Zuckerbraun, H.L. Differential *in vitro* cytotoxicity of (–)-epicatechin gallate (ECG) to cancer and normal cells from the human oral cavity. *Toxicol. In Vitro* **2005**, *19*, 231–242.
41. Tan, Y., Liu, C., Chen, R. Phenolic constituents from stem bark of *Morus wittiorum* and their anti-inflammation and cytotoxicity. *Zhongguo zhongyao zazhi* **2010**, *35*, 2700–2703.
42. Lee, S.B., Cha, K.H., Selenge, D., Solongo, A., Nho, C.W. The chemopreventive effect of taxifolin is exerted through ARE-dependent gene regulation. *Biol. Pharm. Bull.* **2007**, *30*, 1074–1079.
43. Agullo, G., Gamet, L., Besson, C., Demigné, C., Rémésy, C. Quercetin exerts a preferential cytotoxic effect on active dividing colon carcinoma HT29 and Caco-2 cells. *Cancer lett.* **1994**, *87*, 55–63.
44. Alonso-Castro, A.J., Domínguez, F., García-Carrancá, A. Rutin exerts antitumor effects on nude mice bearing SW480 tumor. *Arch. Med. Res.* **2013**, *44*, 346–351.
45. Hsieh, P.W., Chang, F.R., Wu, C.C., Li, C.M., Wu, K.Y., Chen, S.L., Yen, H.F., Wu, Y.C. Longicalycinin A, a new cytotoxic cyclic peptide from *Dianthus superbis* var. *longicalycinus* (Maxim.) Will. *Chem. Pharm. Bull.* **2005**, *53*, 336–338.
46. Babich, H., Sedletcaia, A., Kenigsberg, B. *In vitro* cytotoxicity of protocatechuic acid to cultured human cells from oral tissue: involvement in oxidative stress. *Pharmacol. Toxicol.* **2002**, *91*, 245–253.
47. Kalaivani, T., Rajasekaran, C., Mathew, L. Free radical scavenging, cytotoxic, and hemolytic activities of an active antioxidant compound ethyl gallate from leaves of *Acacia nilotica* (L.) wild. Ex. Delile subsp. *Indica* (Benth.) Brenan. *J. Food Sci.* **2011**, *76*, T144–T149.
48. Pan, X., Matsumoto, M., Nishimoto, Y., Ogiwara, E., Zhang, J., Ukiya, M., Tokuda, H., Koike, K., Akihisa, M., Akihisa, T. Cytotoxic and nitric oxide production-inhibitory activities of limonoids and other compounds from the Leaves and Bark of *Melia azedarach*. *Chem. Biodiverse.* **2014**, *11*, 1121–1139.

Table S2 The binding energy of 138 compounds bound with the crystal structure of the ternary complex of topotecan-DNA-Topo I (PDB ID: 1K4T).

Compounds	MOE Dock ^a (kcal/mol)	Ledock ^b (kcal/mol)
<i>S</i> -(-)-5,6,8-Trihydroxy-4-(1'-hydroxyethyl)isocoumarin	-7.7786	-4.16
Sescandelin B	-7.8138	-3.99
Penicimarin E	-8.8656	-4.34
8-Hydroxy-6-methoxy-3-methylisocoumarin	-7.5626	-3.21
Penicimarin B	-8.7150	-4.07
<i>N</i> -(4-Hydroxy-2-methoxyphenyl)acetamide	-7.1517	-3.53
4-Acetoxy-2-methoxyacetanilide	-8.7605	-3.8
<i>S</i> -(-)-2-(2-Hydroxypropanamido)benzamide	-7.4790	-5.01
Nafuredin	-10.5718	-5.05
2-Methoxybenzene-1,4-diol	-5.7260	-2.77
3,4-Dimethoxyphenol	-6.3581	-2.68
Phenyl-acetic acid methyl ester	-6.6832	-2.49
Methyl <i>p</i> -hydroxy phenyl acetate	-6.6527	-3.13
3-Methoxy phenol	-5.6058	-2.39
Penicillixanthone A	-11.5816	-6.61
Versixanthone F	-13.9518	-7.26
Bacillosporin C	-11.5710	-5.64
Vermixocin A	-9.0248	-5.34
ω -Hydroxyemodin	-8.9439	-4.97
2-(2,6-Dihydroxybenzoyl)-3-hydroxy-5-hydroxymethylbenzoic acid methyl ester	-9.3932	-5.37
3-Hydroxymethyl-6,8-dihydroxyisocoumarin	-7.1588	-3.72
Di-(2-ethyl)-hexylphthalate	-11.6068	-5.15
Cytosporin L	-8.0071	-5.76
Cytosporin E	-7.5546	-3.93
Cytosporin D	-8.7805	-5.11
<i>N</i> -Acetyltryptamine	-8.5530	-4.33
(11 <i>R</i>)-2,11,12-Trihydroxy- β -selinene	-6.7288	-4.36
(11 <i>S</i>)-2,11,13-Trihydroxy- β -selinene	-6.7383	-4.33
Butyrolactone I	-8.9953	-5.31
Butyrolactone II	-8.4991	-5.65
Butyrolactone III	-8.9402	-5.67
Butyrolactone V	-8.7235	-3.74
2,4-Dihydroxy-3,5,6-trimethylbenzoic acid	-7.2234	-3.54
Diorcinol	-8.4427	-4.33
Anodendroic acid	-7.4820	-3.94
Methyl indole-3-carboxylate	-7.1386	-3.82
5-Formylmellein	-7.2639	-3.91

(2 <i>E</i> ,4 <i>E</i> ,6 <i>S</i>)-6-Hydroxydeca-2,4-dienoic acid	-11.1233	-5.18
7-Chloro-5-hydroxymellein	-7.1996	-3.21
5-Carboxylmellein	-7.2904	-3.64
Sclerotinin A	-8.0502	-3.83
Sclerotinin B	-8.1939	-3.99
Decarboxydihydrocitrinin	-7.5784	-3.83
Dihydrocitrinin	-8.3894	-3.6
(22 <i>E</i>)-Ergosta-5,7,9(11)22-tetraen-3 β -ol	-9.6860	-4.06
Ergosta-5,7,22-triene-3 β -ol	-9.8870	-4.77
5 α ,8 α -Epidioxy-ergosta-6,22 <i>E</i> -dien-3 β -ol	-9.8810	-4.96
Altertoxin I	-9.3041	-5.12
6-epi-Stemphytriol	-9.0633	-5.39
7-epi-8-Hydroxyaltertoxin I	-8.4352	-5.7
Stemphyperlenol	-9.3307	-4.99
5 α ,8 α -Epidioxy-ergosta-6,9,22 <i>E</i> -trien-3 β -ol	-9.9299	-4.89
5 α ,8 α -Epidioxy-ergosta-6,22 <i>E</i> -dien-3 β -ol	-10.2242	-4.95
Ergosta-7,22-diene-3 β ,5 α ,6 β -triol	-11.0112	-5.69
3 β ,5 α -Dihydroxy-6 β -methoxyer-gosta-7,22-diene	-10.0029	-5.62
Ergosterol	-9.7855	-4.99
β -Sitosterol glucoside	-12.3521	-7.08
AI-77-C	-11.1595	-6.04
9-Octadecenoic acid-2',3'-dihydroxy propyl ester	-12.1452	-5.08
3,4-Dihydroxybenzoic acid	-6.0901	-3.37
2,3-Dihydroxybenzoic acid	-5.5446	-3.13
Indole-3-carboxylic acid	-6.3862	-4.09
6-epi-Stephacidin A	-10.4080	-5.92
Stephacidin A	-9.9812	-6.06
Notoamide B	-9.4178	-5.78
(-)-Versicolamide B	-9.5583	-5.61
Notoamide D	-9.5547	-5.06
Notoamide Q	-10.4351	-6.63
Kipukasin E	-10.4288	-6.02
Kipukasin D	-11.0463	-6.11
Cordylol C	-8.7782	-4.36
Diorcinol F	-8.6403	-4.35
Violaceol II	-8.7515	-4.84
Sterigmatocystin	-9.4854	-4.53
Methyl 6-acetyl-4-methoxy-5,7,8-trihydroxynaphthalene-2-carboxylate	-8.3894	-4.32
3,5-Dichloroasterric acid	-8.6927	-4.89
Penicillither	-8.5524	-4.78

Dihydrogeodin	-8.4534	-4.55
2-(3-Chloro-4-methyl- γ -resorcyloyl)-5-hydroxy- <i>m</i> -anisic acid methyl ester	-8.4576	-4.43
Cytochalasin Z16	-9.2543	-4.96
Cytochalasin Z17	-9.3522	-4.87
9,10-Anthracenedione	-9.05	-4.56
Pinophilin D	-10.5462	-6.24
Pinophilin E	-10.3545	-5.90
Pinophilin F	-10.6397	-6.08
Sch 1385568	-10.5149	-5.65
Pinophilin B	-9.6737	-6.07
Sch 725680	-9.5385	-5.56
(-)-Mitorubrin	-10.0119	-5.43
(-)-Mitorubrinol	-10.2443	-5.96
(-)-Mitorubrinic acid	-9.6060	-5.98
Isopenicillide	-8.9541	-5.54
Purpactin A	-8.7728	-4.93
Vermistatin	-9.8455	-4.61
Methoxyvermistatin	-9.8457	-4.69
4-Demethylvermistatin	-8.9950	-4.57
4-Demethyl-11-methoxyvermistatin	-10.1777	-4.74
Dihydrovermistatin	-10.1114	-4.57
3- <i>O</i> -Methylfunicone	-10.5720	-4.8
Penifupyrone	-10.1709	-4.74
Funicone	-10.8324	-4.89
3- <i>O</i> -Methyl-5,6-epoxyfunicone	-11.6626	-4.75
Pestalsin A	-8.8730	-3.94
Cyclo(L-Leu-L-Pro)	-8.0535	-3.72
Trichoacorenol	-6.5643	-3.64
Ascotrichic acid	-8.3855	-4.29
Cyclonerotriol	-8.4226	-4.23
5-Hydroxy- <i>N,N</i> -dimethyltryptamine	-8.0560	-4.49
5-Hydroxy- <i>N,N</i> -dimethyltryptamine-oxide	-7.9782	-4.71
5-Methoxy- <i>N,N</i> -dimethyltryptamine	-8.7528	-4.24
5-Methoxy- <i>N,N</i> -dimethyltryptamine-oxide	-8.8962	-4.61
L-Tryptophan	-7.8726	-5.02
<i>N,N</i> -Dimethyl-L-tryptophan	-8.7611	-4.62
2-(Indol-3-yl)ethyl- α -L-rhamnopyra-nosyl-(1 \rightarrow 6)- β -D-glucopyranoside	-11.9737	-6.98
2-(Indol-3-yl)ethyl- β -D-glucopyranoside	-9.7652	-5.77
(-)-Epigallocatechin 3- <i>O</i> -(<i>E</i>)- <i>p</i> -coumaroate	-10.9265	-7.15
(-)-Epigallocatechin 3- <i>O</i> -(<i>Z</i>)- <i>p</i> -coumaroate	-10.1798	-7.15

(-)-Galocatechin	-9.4846	-5.48
(-)-Epigallocatechin	-9.0181	-5.51
(+)-Catechin	-8.2783	-5.24
(-)-Epicatechin	-8.2367	-5.21
(+)-Dihydrokaempferol	-7.9162	-4.76
Dihydroquercetin	-9.4265	-5.26
Quercetin	-9.2606	-5.39
Rutin	-14.1506	-7.7
Quercetin-3- <i>O</i> - α -L-rhamnopyranosyl-(1 \rightarrow 6)- β -D-galactopyranoside	-14.2123	-8.4
2- <i>O</i> -(3,4-Dihydroxybenzoyl)-2,4,6-trihydroxyphenylacetic acid	-8.9730	-5.47
<i>p</i> -Hydroxybenzoic acid	-5.6547	-2.89
Protocatechuic acid	-5.9525	-3.45
Protocaechuic acid methyl ester	-6.6400	-3.36
Protocatechuic acid ethyl ester	-7.2568	-3.65
Ethyl gallate	-7.5169	-3.9
<i>p</i> -Coumaric acid	-6.5956	-3.22
Caffeic acid ester	-7.9648	-3.94
Daucosterol	-12.2041	-6.54
Loliolide	-6.1666	-3.01
Uridine	-7.5324	-4.36
Arbutin	-7.5324	-4.78

^aMOE Dock: cutoff value at -9.0 kcal/mol. ^bLedock: cutoff value at -5.0 kcal/mol

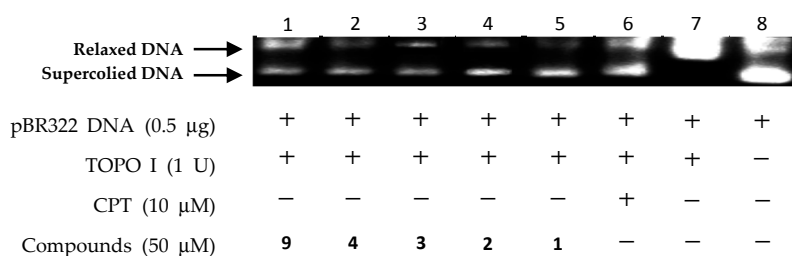


Figure S1 DNA Topo I inhibitory activities of (-)-epigallocatechin 3-*O*-(*E*)-*p*-coumaroate (**1**), (-)-epigallocatechin 3-*O*-(*Z*)-*p*-coumaroate (**2**), (-)-epigallocatechin (**3**), quercetin (**4**) and altertoxin I (**9**) at 50 µM. Lanes 1–5: DNA + Topo I + tested compounds; lane 6: DNA + Topo I + CPT; lane 7: DNA + Topo I; lane 8: DNA.

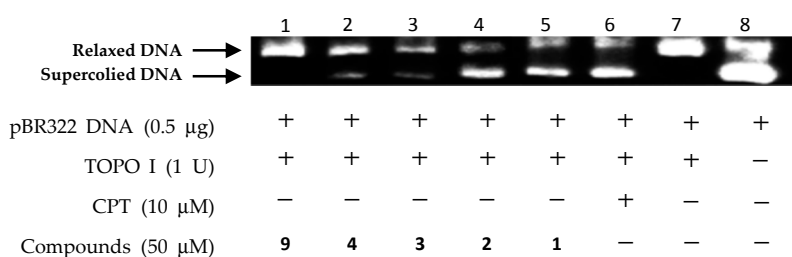


Figure S2 DNA Topo I inhibitory activities of (-)-epigallocatechin 3-*O*-(*E*)-*p*-coumaroate (**1**), (-)-epigallocatechin 3-*O*-(*Z*)-*p*-coumaroate (**2**), (-)-epigallocatechin (**3**), quercetin (**4**) and altertoxin I (**9**) at 25 µM. Lanes 1–5: DNA + Topo I + tested compounds; lane 6: DNA + Topo I + CPT; lane 7: DNA + Topo I; lane 8: DNA

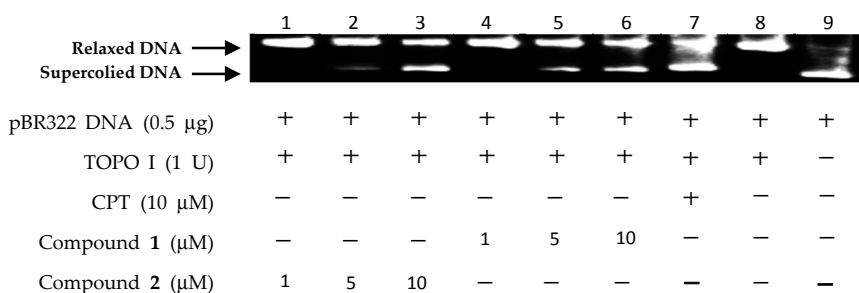


Figure S3 DNA Topo I inhibitory activities of (-)-epigallocatechin 3-*O*-(*E*)-*p*-coumaroate (**1**) and (-)-epigallocatechin 3-*O*-(*Z*)-*p*-coumaroate (**2**) at 1, 5, and 10 µM. Lanes 1–3: DNA + Topo I + compound **2** at various concentrations; Lanes 4–6: DNA + Topo I + compound **1** at various concentrations; lane 7: DNA + Topo I + CPT; lane 8: DNA + Topo I; lane 9: DNA.

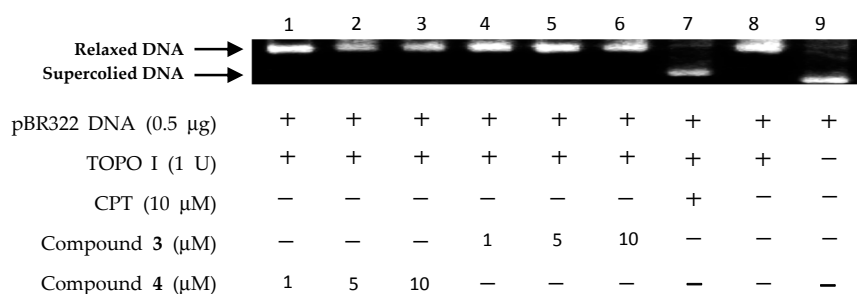


Figure S4 DNA Topo I inhibitory activities of (-)-epigallocatechin (**3**) and quercetin (**4**) at 1, 5, and 10 µM. Lanes 1–3: DNA + Topo I + compound **4** at various concentrations; Lanes 4–6: DNA + Topo I + compound **3** at various concentrations; lane 7: DNA + Topo I + CPT; lane 8: DNA + Topo I; lane 9: DNA.