Fungal-Fungal Co-culture: A Primer for Generating Chemical Diversity

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Table S1. Fungal-Fungal Co-culture Papers from 2002 to early 2020

Figure S1. Structures of compounds isolated from co-culturing pairing. Refer to Supporting Information Table S1.

Table S1. Fungal-Fungal Co-culture Papers from 2002 to early 2020				
Fungi	Taxonomy Phylum level/Ordinal level	Secondary Metabolites (N = New, K= Known)	Biological Activity	Reference
Aspergillus sulphureus and *Isaria felina*	Ascomycota/Eurotiales vs. Hypocreales	17-hydroxynotoamide D (N) **44** 17-O-ethylnotoamide M (N) **45** 10-O-acetylsclerotiamide (N) **46** 10-O-ethylsclerotiamide (N) **47** 10-O-ethylnotoamide R (N) **48** (–)-notoamide B (K) **49** notoamide C (K) **50** dehydronotoamide C (K) **51** notoamide D (K) **52** notoamide F (K) **53** notoamide Q (K) **54** 17-epi-notoamide Q (K) **55** notoamide M (K) **56** sclerotiamide (K) **57**	Inhibition of colony formation prostate cancer cells at non-cytotoxic concentration 10uM (**45**)	Afiyatullov, S.S., Zhuravleva, O.I., Antonov, A.S., Berdyshev, D.V., Pivkin, M.V., Denisenko, V.A., Popov, R.S., Gerasimenko, A.V., von Amsberg, G., Dyshlovoy, S.A., Leshchenko, E.V., Yurchenko, A.N. Prenylated indole alkaloids from co-culture of marine-derived fungi Aspergillus sulphureus and Isaria felina. J. Antibiot. 2018, 71.
Eutypa lata and *Botryosphaeria obtuse*		2-nonanone (K) **83** O-methylmellein (K) **84**	Antifungal (**83, 84)**	Azzollini, A.; Boggia, L.; Boccard, J.; Sgorbini, B.; Lecoultre, N.; Allard, P.-M.; Rubiolo, P.; Rudaz, S.; Gindro, K.; Bicchi, C. Dynamics of metabolite induction in fungal co-cultures by metabolomics at both volatile and non-volatile levels. Front. Microbiol. 2018, 9, 72.
Aspergillus sclerotiorum and *Penicillium citrinum*	Ascomycota/Onygenales vs. Hypocreales	sclerotiorumin A (N) **68** sclerotiorumin B (N) **69** sclerotiorumin C (N) **67** 1-(4-benzyl-1H-pyrrol-3-yl)ethenone (N) **64** aluminiumneohydroxyaspergillin (N) **79** ferrineohydroxyaspergillin (N) **80**	Cytotoxic (**79**)	Bao, J., Wang, J., Zhang, X.-Y., Nong, X.-H., Qi, S.-H. New furanone derivatives and alkaloids from the co-culture of marine-derived fungi Aspergillus sclerotiorum and

		neoaspergillic acid (K) **178**		Penicillium citrinum. Chem. Biodiv. 2017, 14, e1600327
Paraconiothyrium variabile and *Fusarium oxysporum*		Beauvericin (K) **88**	Fungi-static (**88**) Cell toxicity at higher levels	Bärenstrauch, M.; Mann, S.; Jacquemin, C.; Bibi, S.; Sylla, O.-K.; Baudouin, E.; Buisson, D.; Prado, S.; Kunz, C. Molecular crosstalk between the endophyte Paraconiothyrium variabile and the phytopathogen Fusarium oxysporum–modulation of lipoxygenase activity and beauvericin production during the interaction. Fungal Genet. Biol. 2020, 103383.
Trichophyton rubrum and *Bionectria ochroleuca*.		4-hydroxysulfoxy-2,2-dimethylthielavin P (N) **179**		Bertrand, S., Schumpp, O., Bohni, N., Monod, M., Gindro, K., Wolfender, J.-L. De novo production of metabolites by fungal co-culture of Trichophyton rubrum and Bionectria ochroleuca. J. Nat. Prod. 2013, 76, 1157-1165.
Sarocladium strictum and *Fusarium oxysporum*		Fusaric acid (K) **180**		Bohni, N., Hofstetter, V., Gindro, K., Buyck, B., Schumpp, O., Bertrand, S., Monod, M., Wolfender, J.-L. Production of Fusaric Acid by Fusarium spp. in Pure Culture and in Solid Medium Co-Cultures. Molecules 2016, 21, 370.
Alternaria tenuissima and *Nigrospora sphaerica*		Stemphyperylenol (K) **1** Alterperylenol (K) **2**	Antifungal (**1**)	Chagas, F.O., Dias, L.G., Pupo, M.T. A mixed culture of

		altertoxin I (K) **3** alternariol (K) **4** alternariol monomethyl ether (K) **5**		endophytic fungi increases production of antifungal polyketides. J. Chem. Ecol. 2013, 39, 1335-1342.
Paraconiothyrium variabile and *Fusarium oxysporum*		13-oxo-9,11-octadecadienoic acid (K) **81** 13-hydroperoxy-9,11-octadecadienoic acid (K) **82** Beauvericin (K) **88**		Combès, A., Ndoye, I., Bance, C., Bruzaud, J., Djediat, C., Dupont, J., Nay, B., Prado, S., 2012. Chemical Communication between the Endophytic Fungus Paraconiothyrium Variabile and the Phytopathogen Fusarium oxysporum. PLoS One 7(10), e47313.
Two mangrove fungi (strain Nos. K38 and E33)		(–)-byssochlamic acid imide (N) **43**	Antifungal (**43**)	Ding, W., Lu, Y., Feng, Z., Luo, S., Li, C., 2017. A New Nonadride Derivative from the Co-Culture Broth of Two Mangrove Fungi. Chem. Nat. Compd. 53(4), 691-693.
Eutypa lata and *Botryosphaeria obtusa*	Ascomycota/ Xylariales vs. Botryosphaeriales	O-methylmellein (K) **84** Diastereoisomer 1 of 4-Hydroxy-8-O-methylmellein (K) **86** Diastereoisomer 2 of 4-Hydroxy-8-O-methylmellein (K) **87** 5-Hydroxy-8-O-methylmellein (N) **85**	Antifungal (**84**) Antigerminative (**84**)	Glauser, G., Gindro, K., Fringeli, J., De Joffrey, J.-P., Rudaz, S., Wolfender, J.-L. Differential analysis of mycoalexins in confrontation zones of grapevine fungal pathogens by ultrahigh pressure liquid chromatography/time-of-flight mass spectrometry and capillary nuclear magnetic resonance. J. Agric. Food Chem. 2009, 57, 1127-1134.
Pseudoxylaria sp. X802 and *Coriolopsis* sp.		pseudoxylallemycin A (N) **181** pseudoxylallemycin B (N) **182**	Antimicrobial (**181 – 184**)	Guo, H., Kreuzenbeck, N.B., Otani, S., Garcia-Altares, M.,

		pseudoxylallemycin C (N) **183** pseudoxylallemycin D (N) **184** pseudoxylallemycin E (N) **185** pseudoxylallemycin F (N) **186** eucalyptene A (K) **187** terricollene C (K) **188** 19,20-epoxycytochalasin C (K) **189** 19,20-epoxycytochalasin D (K) **190** 19,20- epoxycytochalasin Q (K) **191**		Dahse, H.-M., Weigel, C., Aanen, D.K., Hertweck, C., Poulsen, M., Beemelmanns, C. Pseudoxylallemycins A–F, Cyclic Tetrapeptides with Rare Allenyl Modifications Isolated from Pseudoxylaria sp. X802: A Competitor of Fungus-Growing Termite Cultivars. Org. Lett. 2016, 18, 3338-3341.
Hypoxylon rubiginosum (9969) and *Hymenoscyphus fraxineus(*VER/2)		Phomopsidin (K) **192** 10-hydroxyphomopsidin (N) **193** Viridiol (K) **194**	Antimicrobial (**192, 194**)	Halecker, S.; Wennrich, J.-P.; Rodrigo, S.; Andrée, N.; Rabsch, L.; Baschien, C.; Steinert, M.; Stadler, M.; Surup, F.; Schulz, B. Fungal endophytes for biocontrol of ash dieback: The antagonistic potential of Hypoxylon rubiginosum. Fungal Ecology 2020, 45, 100918.
Phomopsis sp. K38 and *Alternaria* sp. E33	Ascomycota/ Pleosporales vs. Pleosporales	cyclo (D-Pro-L-Tyr-L-Pro-L-Tyr) (N) **59** cyclo (Gly-L-Phe-L-Pro-L-Tyr) (N) **58**	Antifungal (**58,59**)	Huang, S., Ding, W., Li, C., Cox, D. Two new cyclopeptides from the co-culture broth of two marine mangrove fungi and their antifungal activity. Pharmacogn. Mag. 2014, 10, 410-414.
Aspergillus fischeri and *Xylaria flabelliformis* .		Sartorypyrone A (K) **98** Aszonalenin (K) **92** Acetylaszonalenin (K) **93** Fumitremorgin A (K) **89** Fumitremorgin B (K) **90** C-11 epimer of verruclogen TR-2 **91**		Knowles, S. L.; Raja, H. A.; Isawi, I. H.; Flores-Bocanegra, L.; Reggio, P. H.; Pearce, C. J.; Burdette, J. E.; Rokas, A.; Oberlies, N. H. Wheldone: Characterization of a Unique Scaffold from

		Griseofulvin (K) **94** Dechlorogriseofulvin (K) **95** Dechloro-5-hydroxygrisoefulvin (K) **96** 5-hydroxygriseofulvin (K) **108** 7-O-acetylcytochalasin B (K) **97** hirsutatin A (K) **103** zygosporin E (K) **102** cytochalasin C (K) **99** cytochalasin D (K) **100** cytochalasin Q (K) **101**		the Coculture of Aspergillus fischeri and Xylaria flabelliformis. Org. Lett. 2020, 22, 1878-1882.
Aspergillus fischeri and *Xylaria cubensis*	Ascomycota/ Eurotiales vs. Xylariales	Wheldone (N) **104**	Cytotoxic (**104**)	Knowles, S. L.; Raja, H. A.; Wright, A. J.; Lee, A. M. L.; Caesar, L. K.; Cech, N. B.; Mead, M. E.; Steenwyk, J. L.; Ries, L.; Goldman, G. H.; Rokas, A.; Oberlies, N. H. Mapping the Fungal Battlefield: Using in situ Chemistry and Deletion Mutants to Monitor Interspecific Chemical Interactions Between Fungi. Front. Microbiol. 2019, 10, 285.
Penicillium sp. and *Trichoderma* sp.		(*Z*)-2-ethylhex-2-enedioic acid (N) **195** (*E*)-4-oxo-2-propylideneoct-7-enoic acid (N) **196**		Kossuga, M.H., Ferreira, A.G., Sette, L.D., Berlinck, R.G.S. Two Polyketides from a Co-culture of Two Marine-derived Fungal Strains. Nat. Prod. Commun. 2013, 8, 721-724.
Camporesia sambuci FT1061 and *Epicoccum sorghinum* FT1062	Ascomycota/ Xylariales vs. Pleosporales	11S-hydroxy-1-methoxyfusaricide (N) **34** epicoccarine B (K) **33** (+)-epipyridone (K) **35** D8646-2-6 (K) **36**	Antifungal (**36, 37**) Anti-proliferative (**33**)	Li, C., Sarotti, A., Yang, B., Turkson, J., Cao, S. A New N-methoxypyridone from the Co-Cultivation of Hawaiian Endophytic Fungi Camporesia

		iso-D8646-2-6 (K) **37**		sambuci FT1061 and Epicoccum sorghinum FT1062. Molecules 2017, 22, 1166
Phomopsis sp. K38 and *Alternaria* sp. E33	Ascomycota/ Pleosporales vs. Pleosporales	cyclo-(L-leucyl-trans-4-hydroxy-L-prolyl-D-leucyl-trans-4-hydroxy-L-proline) (N) **60**	Antifungal (**60**)	Li, C., Wang, J., Luo, C., Ding, W., Cox, D.G. A new cyclopeptide with antifungal activity from the co-culture broth of two marine mangrove fungi. Nat. Prod. Res. 2014, 28, 616-621.
Phomopsis sp. K38 and *Alternaria* sp. E33	Ascomycota/ Pleosporales vs. Pleosporales	8-hydroxy-3-methyl-9-oxo-9H-xanthene-1-carboxylic acid methyl ether (N) **61**	Antifungal **(61)**	Li, C., Zhang, J., Shao, C., Ding, W., She, Z., Lin, Y. A new xanthone derivative from the co-culture broth of two marine fungi (strain No. E33 and K38). Chem. Nat. Compd. 2011, 47, 382-384.
Phomopsis sp. K38 and *Alternaria* sp. E33	Ascomycota/ Pleosporales vs. Pleosporales	(−)-byssochlamic acid bisdiimide (N) **42**	Weak cytotoxicity (**42**)	Li, C.-Y.; Ding, W.-J.; Shao, C.-L.; She, Z.-G.; Lin, Y.-C. A new diimide derivative from the co-culture broth of two mangrove fungi (strain no. E33 and K38). Journal of Asian Natural Products Research 2010, 12, 809-813
Phoma sp. *and Armillaria* sp.	Ascomycota vs. Basidiomycota/Pleosporales vs. Agaricales	Phexandiol A (N) **10** Phexandiol B (N) **11** Phomester A (N) **7** Phomester B (N) **8** Phomester C (N) **9**		Li, H.-T., Zhou, H., Duan, R.-T., Li, H.-Y., Tang, L.-H., Yang, X.-Q., Yang, Y.-B., Ding, Z.-T. Inducing Secondary Metabolite Production by Co-culture of the Endophytic Fungus Phoma sp. and the Symbiotic Fungus Armillaria sp. J. Nat. Prod. 2019, 82, 1009–1013.

Sexual *Aspergillus alliaceus* and asexual *Aspergillus alliaceus*	Ascomycota/ Eurotiales vs. Eurotiales	Allianthrone A (N) **18** Allianthrone B (N) **19** Allianthrone C (N) **20**	Cytotoxic (**18**)	Mandelare, P.; Adpressa, D.; Kaweesa, E.; Zakharov, L.; Loesgen, S. Coculture of two developmental stages of a marine-derived Aspergillus alliaceus results in the production of the cytotoxic bianthrone allianthrone A. J. Nat. Prod. 2018, 81, 1014-1022.
Penicillium citrinum and *Beauveria felina*		Citrifelin A (N) **109** Citrifelin B (N) **110** dicitrinin A (K) **111** dihydrocitrinone (K) **112** decarboxydihydrocitrinone (K) **113** destruxin A (K) **114** roseotoxin B (K) **115** isaridin A (K) **116** isaridin B (K) **117**	Antimicrobial (**109, 110, 113**)	Meng, L.-H., Liu, Y., Li, X.-M., Xu, G.-M., Ji, N.-Y., Wang, B.-G., 2015. Citrifelins A and B, Citrinin Adducts with a Tetracyclic Framework from Cocultures of Marine-Derived Isolates of Penicillium citrinum and Beauveri a feline. J. Nat. Prod. 2015, 78, 2301-2305.
Talaromyces pinophilus and *Paraphaeosphaeria* sp.		talarodone A (N) **118** penicidone C (K) **119** penicidone D (K) **120**		Murakami, S.; Hayashi, N.; Inomata, T.; Kato, H.; Hitora, Y.; Tsukamoto, S. Induction of secondary metabolite production by fungal co-culture of Talaromyces pinophilus and Paraphaeosphaeria sp. Journal of Natural Medicines 2020, 1-5.
Penicillium pinophilum FKI-5653 and *Trichoderma harzianum* FKI-5655		secopenicillide C (N) **121** penicillide (K) **122** MC-141 (K) **123** pestalasin A (K) **124** stromemycin (K) **125**		Nonaka, K., Abe, T., Iwatsuki, M., Mori, M., Yamamoto, T., Shiomi, K., Omura, S., Masuma, R. Enhancement of metabolites productivity of Penicillium

				pinophilum FKI-5653, by co-culture with Trichoderma harzianum FKI-5655. J. Antibiot. 2011, 64, 769-774.
Talaromyces siamensis FKA-61 and *Phomopsis* sp. FKA-62		BE-31405 (K) **126**	Antifungal(**126**)	Nonaka, K., Iwatsuki, M., Horiuchi, S., Shiomi, K., Omura, S., Masuma, R. Induced production of BE-31405 by coculturing of Talaromyces siamensis FKA-61 with a variety of fungal strains. J. Antibiot. 2015, 68, 573-578.
Irpex lacteus and *Phaeosphaeria oryzae*	Basidiomycota vs. Ascomycota/ Polyporales vs. Pleosporales	Irpexine (N) **41** Hypoxyxylerone (K) **40**		Sadahiro, Y.; Kato, H.; Williams, R. M.; Tsukamoto, S. Irpexine, an Isoindolinone Alkaloid Produced by Coculture of Endophytic Fungi, Irpex lacteus and Phaeosphaeria oryzae. J. Nat. Prod. 2020, 85, 1368-1373.
Chaunopycnis sp. and *Trichoderma hamatum*	Ascomycota/ Hypocreales vs. Hypocreales	chaunopyran A (N) **78** pyridoxatin (K) **66** methyl-pyridoxatin (N) **65**		Shang, Z., Salim, A.A., Capon, R.J. Chaunopyran A: Co-Cultivation of Marine Mollusk-Derived Fungi Activates a Rare Class of 2-Alkenyl-Tetrahydropyran. J. Nat. Prod. 2017, 80, 1167-1172.
Trametes robiniophila Murr and *Pleurotus ostreatus*		postrediene A (N) **127** postrediene B (N) **128** postrediene C (N) **129**	Antifungal(**127, 128, 129**)	Shen, X.-T., Mo, X.-H., Zhu, L.-P., Tan, L.-L., Du, F.-Y., Wang, Q.-W., Zhou, Y.-M., Yuan, X.-J., Qiao, B., Yang, S. Unusual and highly bioactive sesterterpenes synthesized by

				Pleurotus ostreatus during the co-culture with Trametes robiniophila Murr. Appl. Environ. Microbiol. 2019, 85, AEM.00293-19
Paraconiothyrium SSM001 and *Phomopsis* sp.		Taxol (K) **130**		Soliman, S.S.M., Raizada, M.N. Interactions between co-habitating fungi elicit synthesis of Taxol from an endophytic fungus in host Taxus plants. Front. Microbiol. 2013, 4, 3
Penicillium fuscum and *Penicillium camembertii/clavigerum*	Ascomycota/ Eurotiales vs. Eurotiales	berkeleylactone A (N) **70** berkeleylactone B (N) **71** berkeleylactone C (N) **72** berkeleylactone D (N) **73** berkeleylactone E (N) **74** berkeleylactone F (N) **75** berkeleylactone G (N) **76** berkeleylactone H (N) **77** A26771B (K) **197**	Antimicrobial (**70 - 76**)	Stierle, A.A., Stierle, D.B., Decato, D., Priestley, N.D., Alverson, J.B., Hoody, J., McGrath, K., Klepacki, D., The Berkeleylactones, Antibiotic Macrolides from Fungal Coculture. J. Nat. Prod. 2017, 80, 1150-1160.
Moniliophthora roreri and *Trichoderma harzianum*		T39 butenolide (K) **107** Harzianolide (K) **106** Sorbicillinol (K) **105**		Tata, A., Perez, C., Campos, M.L., Bayfield, M.A., Eberlin, M.N., Ifa, D.R. Imprint Desorption Electrospray Ionization Mass Spectrometry Imaging for Monitoring Secondary Metabolites Production during Antagonistic Interaction of Fungi. Anal. Chem. 2015, 87, 12298-12305.
Two Marine Fungi (STRAIN Nos. E33 AND K38) (Wang, J.	NA	Ethyl 5-Ethoxy-2-formyl-3-hydroxy-4-methylbenzoate (N) **63**	Antifungal (**63**)	Wang, J., Ding, W., Li, C., Huang, S., She,

et al., 2013)				Z., Lin, Y. A New Polysubstituted Benzaldehyde from the co-culture broth of Two Marine Fungi (Strains Nos. E33 and K38). Chem. Nat. Compd. 2013, 49, 799-802.
Fungi E33 and K38 (Wang et al., 2015)		7-(γ,γ-dimethylallyloxy)-6-hydroxy-4-methylcoumarin (N) **62**	Antifungal (**62**)	Wang, J., Huang, S., Li, C., Ding, W., She, Z., Li, C. A New Coumarin Produced by Mixed Fermentation of Two Marine Fungi. Chem. Nat. Compd. 2015, 51, 239-241.
Fusarium tricinctum and *Fusarium begoniae*		subenniatin A (N) **131** subenniatin B (N) **132**		Wang, J.-p., Lin, W., Wray, V., Lai, D., Proksch, P. Induced Production of Depsipeptides by Co-Culturing Fusarium tricinctum and Fusarium begoniae. Tetrahedron Lett. 2013, 54, 2492-2496.
Aspergillus flavipes and *Chaetomium globosum*		Aspochalasinol A (N) **133** Aspochalasinol B (N) **134** Aspochalasinol C (N) **135** Aspochalasinol D (N) **136** Oxichaetoglobosin A (N) **137** Oxichaetoglobosin B (N) **138** Oxichaetoglobosin C (N) **139** Oxichaetoglo bosin D (N) **140** Oxichaetoglobosin E (N) **141** Oxichaetoglobosin F (N) **142** Oxichaetoglobosin G (N) **143** Oxichaetoglobosin H (N) **144** Oxichaetoglobosin I (N) **145** chaetoglobosin D (K) **146** chaetoglobosin C (K) **147** epicoccine (K) **148** epicocconigrone (K) **149** chaetomugilide B (K) **150**	antiproliferative activities **(140, 143, 135, 139, 141, 142)**	Wang, W.; Gong, J.; Liu, X.; Dai, C.; Wang, Y.; Li, X.-N.; Wang, J.; Luo, Z.; Zhou, Y.; Xue, Y.; Zhu, H.; Chen, C.; Zhang, Y. Cytochalasans produced by the coculture of Aspergillus flavipes and Chaetomium globosum. J. Nat. Prod. 2018, 81, 1578-1587.
Trametes versicolor and		2,5,6-trihydroxy-4,6-diphenylcyclohex-4-ene-	Antioxidant and anticancer	Xu, X.-Y., Shen, X.-

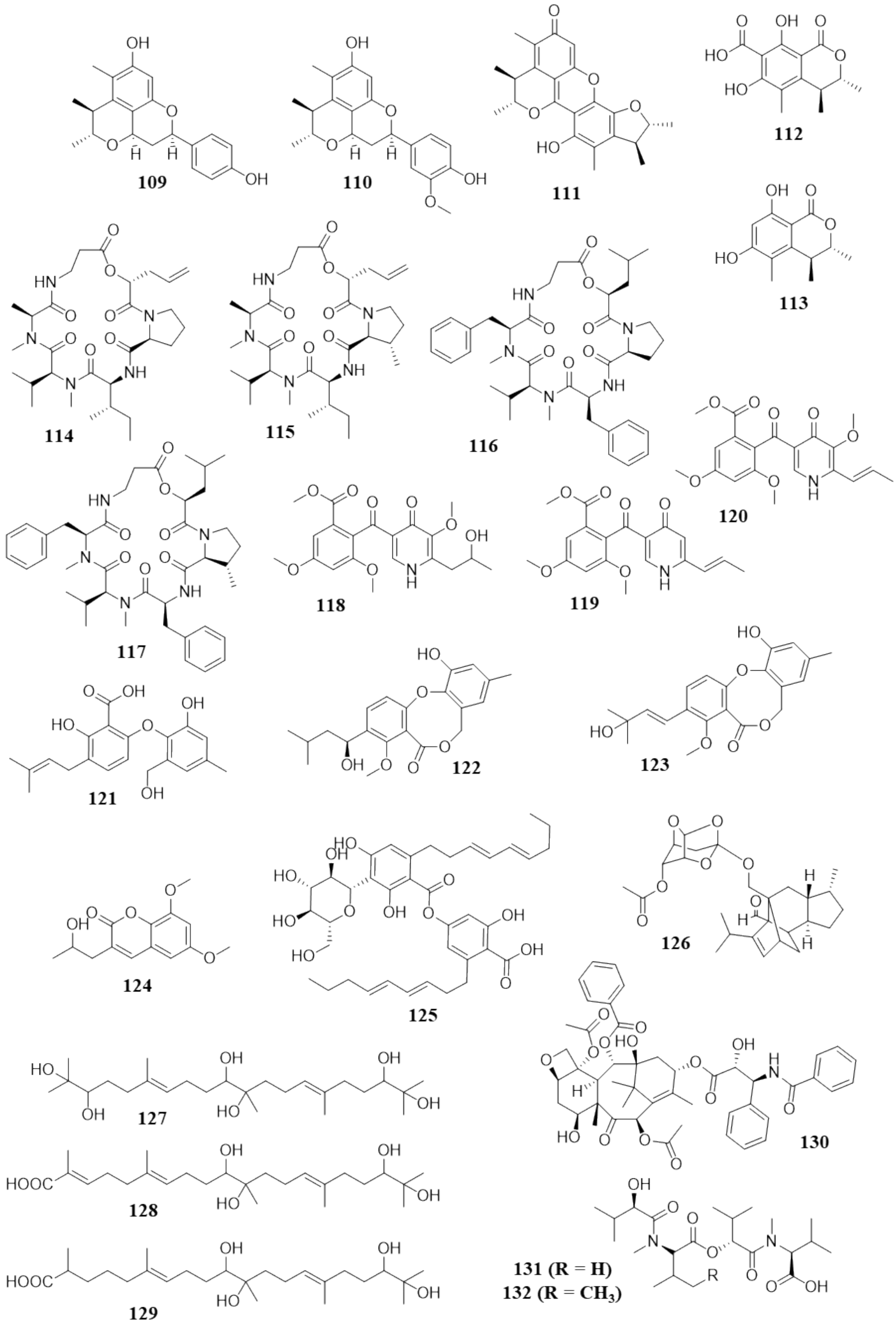
Ganoderma applanatum		1,3-dione) (N) **151** oresellinic acid (N) **152**	(**151, 152**)	T., Yuan, X.-J., Zhou, Y.-M., Fan, H., Zhu, L.-P., Du, F.-Y., Sadilek, M., Yang, J., Qiao, B., Yang, S. Metabolomics Investigation of an Association of Induced Features and Corresponding Fungus during the Co-culture of Trametes versicolor and Ganoderma applanatum. Front. Microbiol. 2018, 8, 2647.
Aspergillus sydowii EN-534 and *Penicillium citrinum* EN-535	Ascomycota/Eurotiales vs. Eurotiales	seco-penicitrinol A (N) **21** penicitrinol L (N) **22**	Moderate anti-influenza (**21**)	Yang, S.-Q., Li, X.-M., Li, X., Li, H.-L., Meng, L.-H., Wang, B.-G. New citrinin analogues produced by coculture of the marine algal-derived endophytic fungal strains Aspergillus sydowii EN-534 and Penicillium citrinum EN-535. Phytochem. Lett. 2018, 25, 191-195
Trametes versicolor and *Ganoderma applanatum*		3-phenyllactic acid (K) **153** N-(4-methoxyphenyl)formamide 2-O-β-D-xyloside (N) **154** N-(4-methoxyphenyl)formamide 2-O-β-D-xylobioside (N) **155**		Yao, L.; Zhu, L.-P.; Xu, X.-Y.; Tan, L.-L.; Sadilek, M.; Fan, H.; Hu, B.; Shen, X.-T.; Yang, J.; Qiao, B.; Yang, S. Discovery of novel xylosides in co-culture of basidiomycetes Trametes versicolor and Ganoderma applanatum by integrated metabolomics and bioinformatics. Sci. Rep. 2016, 6, 33237.
Penicillium crustosum PRB-2 and *Xylaria* sp. HDN13-249		Penixylarin A (N) **156** Penixylarin B (N) **157**	Antibacterial (**157, 158, 160, 161)**	Yu, G., Sun, Z., Peng, J., Zhu, M., Che, Q., Zhang, G., Zhu, T.,

		Penixylarin C (N) **158** Penixylarin D (N) **159** 1,3-dihydroxy-5-(12-hydroxyheptadecyl)benzene (K) **160** 1,3-dihydroxy-5-(12-sulfoxyheptadecyl)benzene (K) **161**		Gu, Q., Li, D. Secondary Metabolites Produced by Combined Culture of Penicillium crustosum and a Xylaria sp. J. Nat. Prod. 2019, 82, 2013–2017
Talaromyces aculeatus and *Penicillium variabile*		Penitalarin A (N) **162** Penitalarin B (N) **163** Penitalarin C (N) **164** nafuredin B (N) **165** nafuredin A (K) **166**	Cytotoxic (**165**)	Zhang, Z., He, X., Zhang, G., Che, Q., Zhu, T., Gu, Q., Li, D. Inducing Secondary Metabolite Production by Combined Culture of Talaromyces aculeatus and Penicillium variabile. J. Nat. Prod. 2017, 80, 3167-3171
Nigrospora oryzae and *Beauveria bassiana*	Ascomycota/Xylariales vs. Hypocreales	Nigbeauvin A (N) **28** Nigbeauvin B (N) **29** Nigbeauvin C (N) **30** Nigbeauvin D (N) **31** Nigbeauvin E (N) **32**		Zhang, Z.-X., Yang, X.-Q., Zhou, Q.-Y., Wang, B.-Y., Hu, M., Yang, Y.-B., Zhou, H., Ding, Z.-T. New Azaphilones from Nigrospora oryzae Co-Cultured with Beauveria bassiana. Molecules 2018, 23, 1816.
Nigrospora oryzae and *Irpex lacteus*	Ascomycota vs. Basidiomycota/Xylariales vs. Polyporales	Nigirpexin A (N) **23** Nigirpexin B (N) **24** Nigirpexin C (N) **25** Nigirpexin D (N) **26** Nigrosirpexin A (N) **27**		Zhou, Q.-Y., Yang, X.-Q., Zhang, Z.-X., Wang, B.-Y., Hu, M., Yang, Y.-B., Zhou, H., Ding, Z.-T. New azaphilones and tremulane sesquiterpene from endophytic Nigrospora oryzae cocultured with Irpex lacteus. Fitoterapia 2018, 130, 26-30
Two isolates of *Aspergillus* sp.	Ascomycota/Eurotiales vs. Eurotiales	Aspergicin (N) **6** Neoaspergillic acid (K) **178**	Antibacterial (**6**)	Zhu, F., Chen, G., Chen, X., Huang, M., Wan, X. Aspergicin, a new antibacterial alkaloid produced by mixed fermentation of

				two marine-derived mangrove epiphytic fungi. Chem. Nat. Compd. 2011, 47, 767-769.
Marine fungal strains (Nos. 1924 and 3893)	NA	Marinamide (N) **38** methyl ester Marinamide (N) **39**	Cytotoxic (**38, 39**) Antibacterial (**38, 39**)	Zhu, F., Lin, Y. Marinamide, a novel alkaloid and its methyl ester produced by the application of mixed fermentation technique to two mangrove endophytic fungi from the South China Sea. Chinese Sci. Bull. 2006, 51, 1426-1430. Structural revision Zhu, F.; Chen, G.; Wu, J.; Pan, J. Structure revision and cytotoxic activity of marinamide and its methyl ester, novel alkaloids produced by co-cultures of two marine-derived mangrove endophytic fungi. Natural product research 2013, 27, 1960-1964.
Nigrospora oryzae and *Collectotrichum gloeosporioides, Irpex lacteus*		nigrosirpexin B (N) **167** nigrosirpexin C (N) **168** nigirpexin E (N) **169** nigrosirpexin D (N) **170** nigrosirpexin E (N) **171** nigcollin A (N) **172** nigcollin B (N) **173** nigcollin C (N) **174** nigcollin D (N) **175** nigcollin E (N) **176** nigrosirpexin F (N) **177**		Shi, L.-J.; Wu, Y.-M.; Yang, X.-Q.; Xu, T.-T.; Yang, S.; Wang, X.-Y.; Yang, Y.-B.; Ding, Z.-T. The Cocultured Nigrospora oryzae and Collectotrichum gloeosporioides, Irpex lacteus, and the Plant Host Dendrobium officinale Bidirectionally Regulate the Production of Phytotoxins by Anti-phytopathogenic Metabolites. J. Nat.

				Prod. 2020, 83, 1374-1382.
Phoma sp. YUD17001 and *Armillaria* sp.	Ascomycota vs. Basidiomycota/Pleosporales vs. Agaricales	phomretone A (N) **12** phomretone B (N) **13** phomretone C (N) **14** phomretone D (N) **15** phomretone E (N) **16** phomretone F (N) **17**		Li, H.-T.; Liu, T.; Yang, R.; Xie, F.; Yang, Z.; Yang, Y.; Zhou, H.; Ding, Z.-T. Phomretones A–F, C 12 polyketides from the co-cultivation of Phoma sp. YUD17001 and Armillaria sp. RSC Adv. 2020, 10, 18384-18389.

Figure S1. Structures of compounds isolated from co-culturing pairing. Refer to Supporting Information Table S1.



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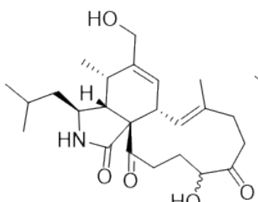
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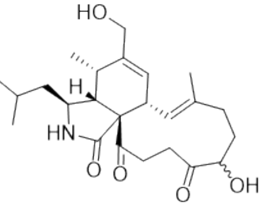
134 (R)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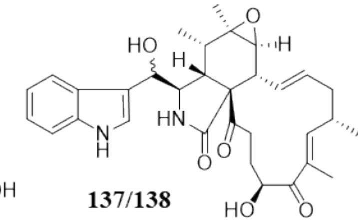
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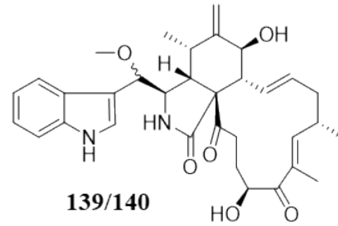
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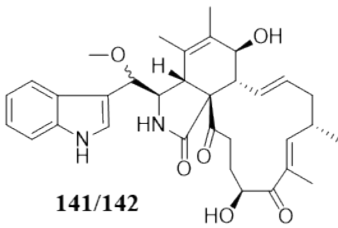
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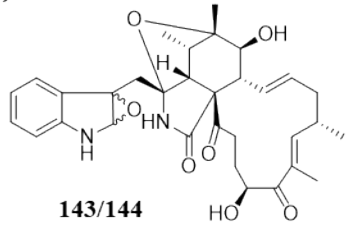
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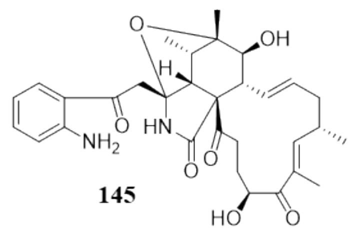
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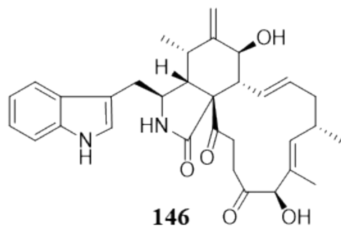
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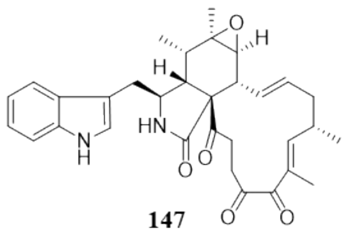
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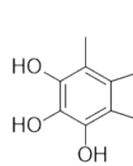
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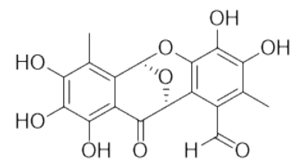
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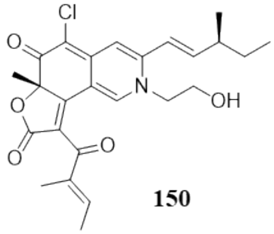
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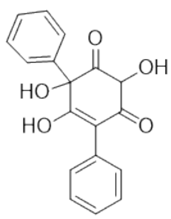
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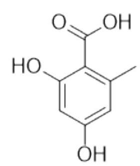
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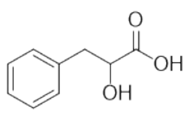
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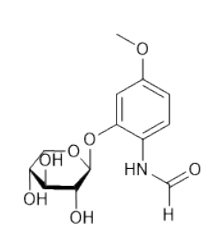
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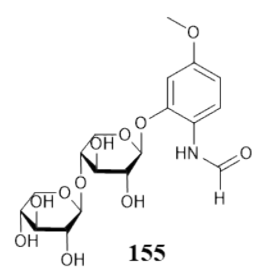
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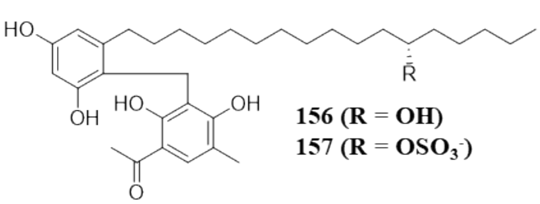
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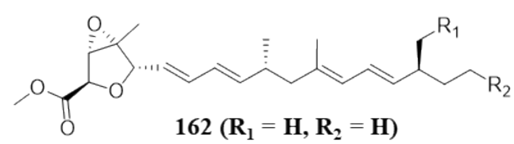
157 (R = OSO_3^-)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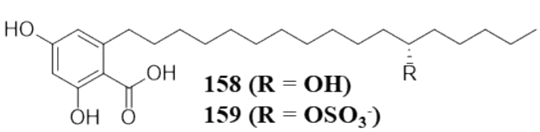
163 (R_1 = H, R_2 = OH)
164 (R_1 = OH, R_2 = H)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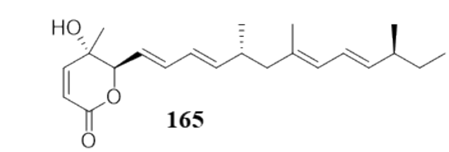
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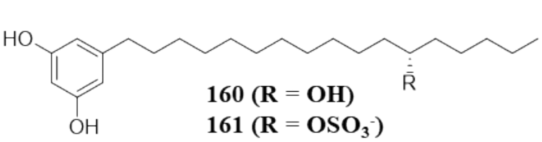
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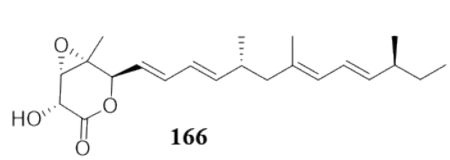
161 (R = OSO_3^-)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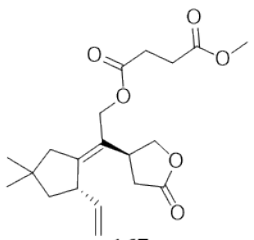
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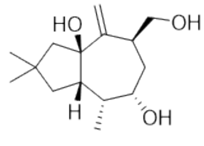
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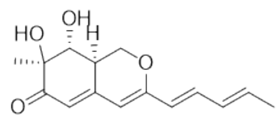
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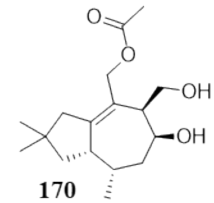
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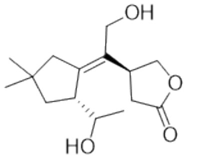
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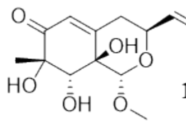
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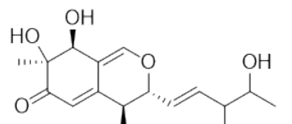
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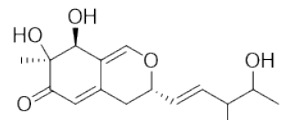
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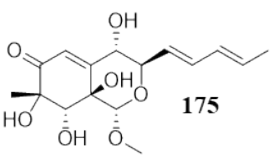
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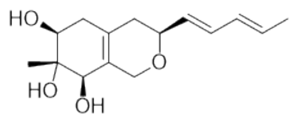
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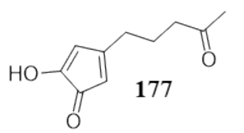
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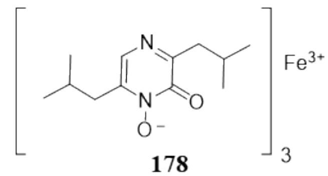
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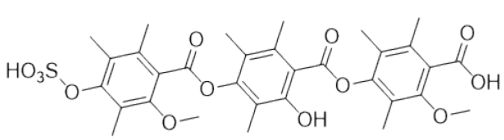
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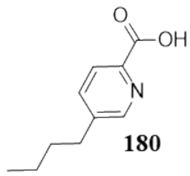
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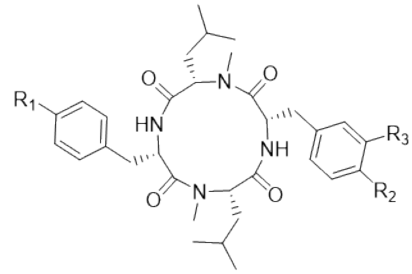

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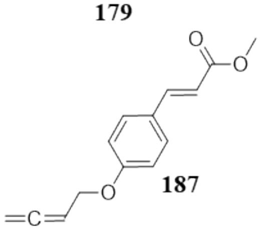
183 (R_1 = H, R_2 = OCH_2CHCCH_2, R_3 = H)
184 (R_1 = H, R_2 = OCH_2CHCCH_2, R_3 =OH)
185 (R_1 = H, R_2 = $OCH_2CHCHCH_3$, R_3 = H)
186 (R_1 = OCH_2CHCCH_2,
R_2 = $OCH_2CHCHCH_3$, R_3 = H)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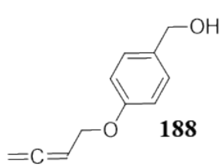
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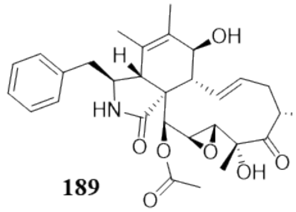
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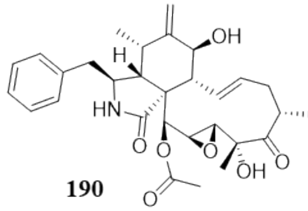
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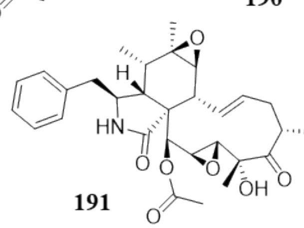
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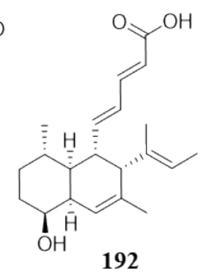
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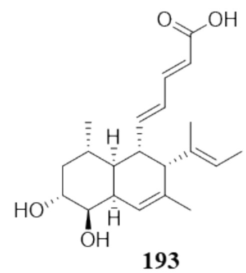
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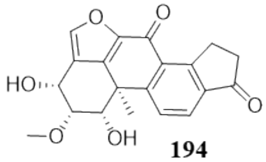
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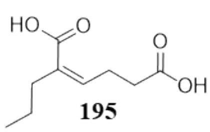
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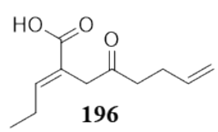
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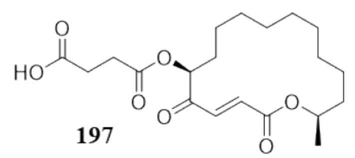
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