



Natural Product Reports

REVIEW

Supporting Information

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Natural products modulating the hERG channel: heartaches and hope

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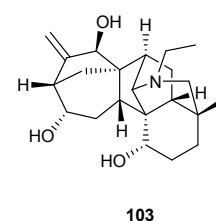
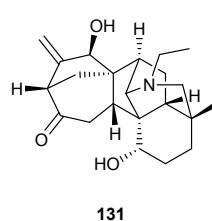
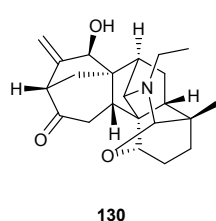
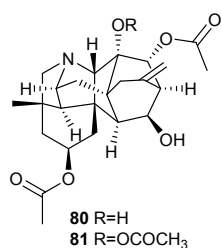
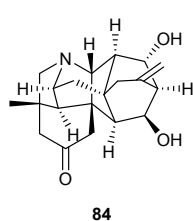
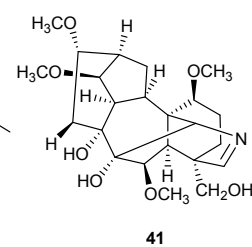
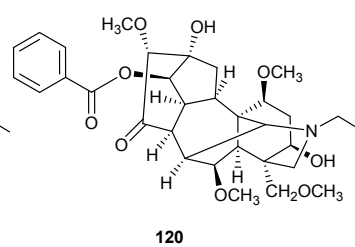
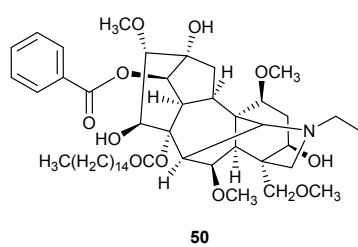
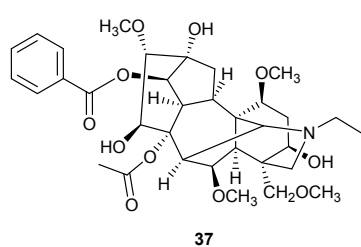
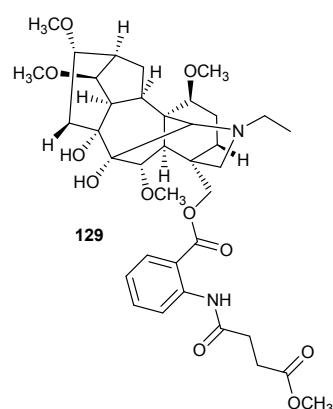
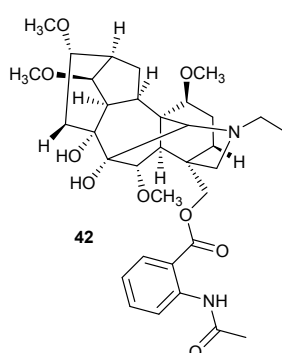
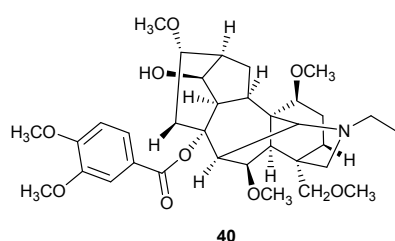
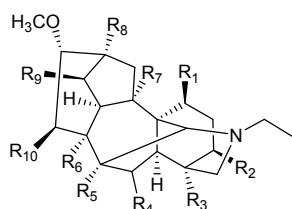
^b CytoBioscience GmbH, Nattermannallee 1, 50829 Cologne, Germany.

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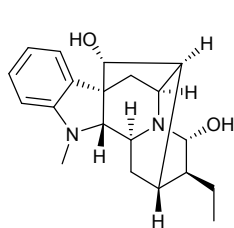
Fig. S1 Alkaloid structures of natural compounds tested for hERG channel inhibition (grouped according to structural subclasses).

DITERPENOID ALKALOIDS

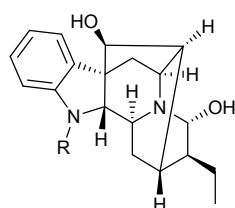
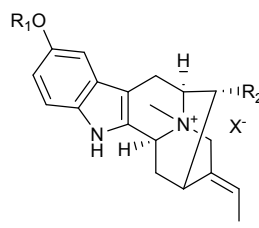
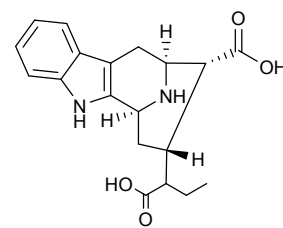
no.	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10
38	OCH ₃	H	H	H	H	OH	H	H	OH	H
39	OCH ₃	OH	H	H	H	OH	H	H	OH	H
66	OH	H	CH ₂ OCH ₃	α-OCH ₃	OH	OH	H	H	OH	H
67	OCH ₃	H	CH ₂ OH	α-OCH ₃	OH	OH	H	H	OH	H
68	OH	H	CH ₃	β-OH	OH	OCH ₃	H	H	OH	H
70	OCH ₃	H	H	H	H	OH	H	H	OCOCH ₃	H
79	OH	H	CH ₂ OH	α-OCH ₃	OH	OH	H	H	OCH ₃	H
86	OCH ₃	H	CH ₂ OCH ₃	H	H	OCH ₃	OH	H	OH	H
89	OH	H	CH ₂ OCH ₃	H	H	OH	H	H	OH	H
91	OH	H	CH ₃	H	H	OH	H	H	OH	H
95	OCH ₃	H	CH ₂ OH	α-OCH ₃	OH	OH	H	H	OCH ₃	H
106	OH	H	CH ₂ OCH ₃	β-OCH ₃	H	OH	H	H	OH	H
107	OH	H	CH ₂ OH	β-OCH ₃	H	OH	H	H	OH	H
127	OH	H	CH ₂ OCH ₃	OH	H	OH	H	H	OH	H
128	OH	H	CH ₂ OCH ₃	OCH ₃	H	OH	H	H	OH	OH
134	OCH ₃	H	CH ₂ OH	α-OCH ₃	OH	OH	OH	H	OCH ₃	H
135	OH	H	CH ₂ OH	α-OCH ₃	OH	OH	H	H	OH	H



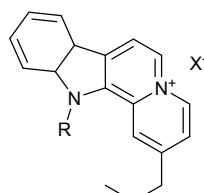
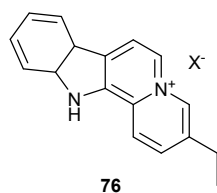
INDOLE ALKALOIDS



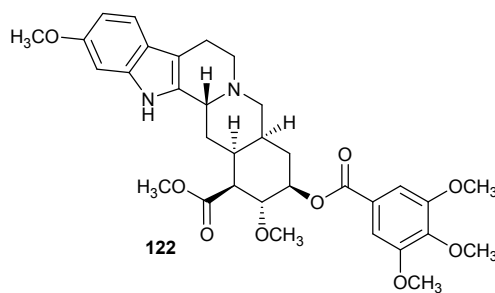
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125 R=CH₃
111 R=H133 R₁=CH₃, R₂=CH₂OH
94 R₁=CH₃, R₂=CH₂OH
97 R₁=CH₃, R₂=COOH

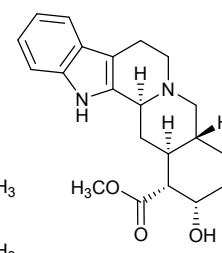
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115 R=H
101 R=CH₃

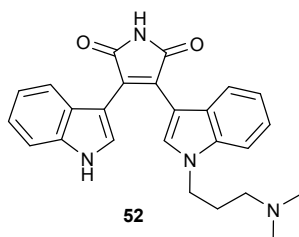
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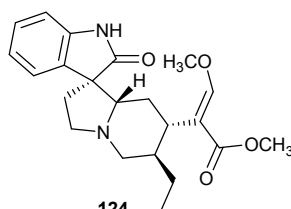
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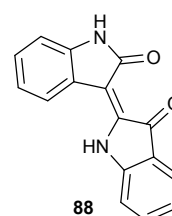
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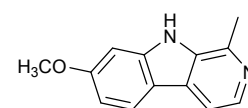
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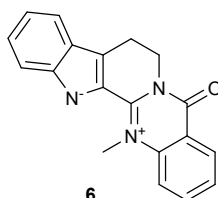
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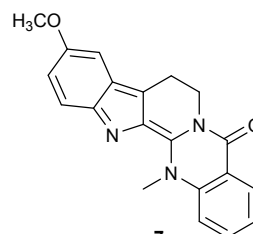
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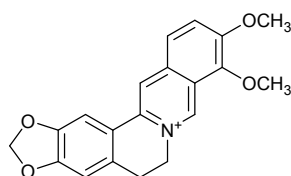


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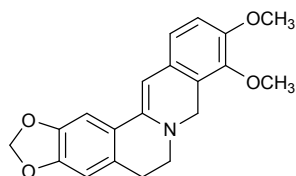


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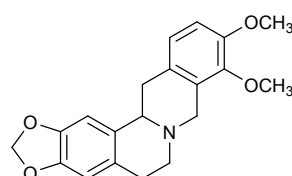
PROTOBERBERINE ALKALOIDS



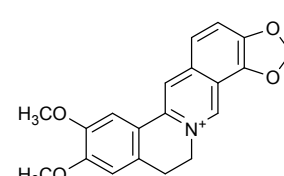
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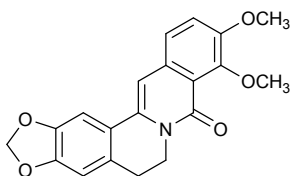
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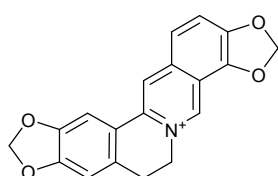
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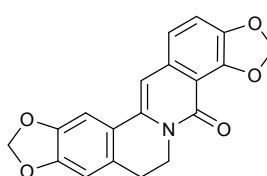
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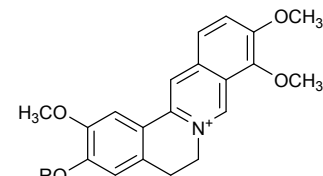
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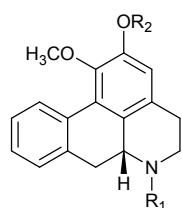
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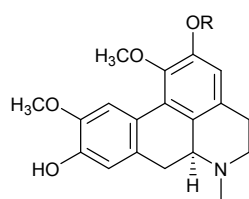
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90 R=H
116 R=CH₃

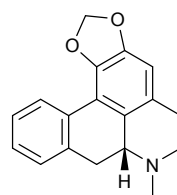
QUINOLINE ALKALOIDS: APORPHINE ALKALOIDS



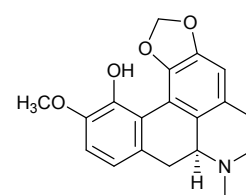
14 R₁=H, R₂=H
114 R₁=CH₃, R₂=CH₃
110 R₁=H, R₂=CH₃
15 R₁=CH₃, R₂=H



100 R=CH₃
53 R=H

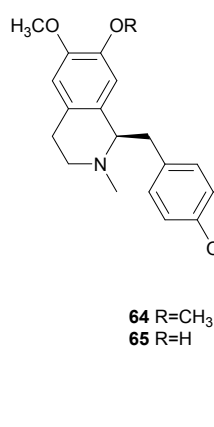


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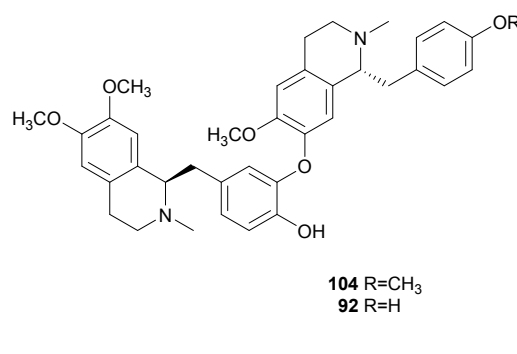


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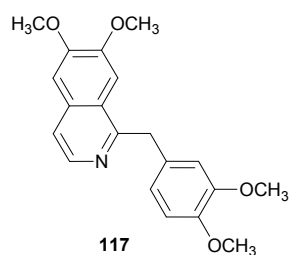
ISOQUINOLINE & (BIS)BENZYLISOQUINOLINE ALKALOIDS



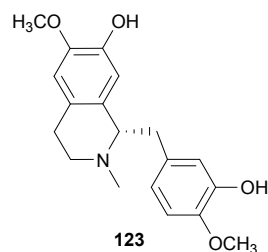
64 R=CH₃
65 R=H



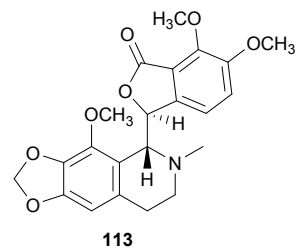
104 R=CH₃
92 R=H



117

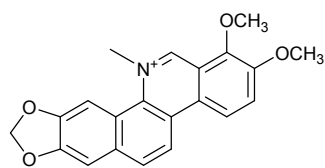


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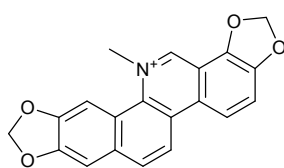


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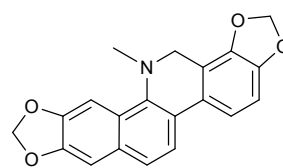
BENZOPHENANTHRIDINE ALKALOIDS AND DERIVATIVES



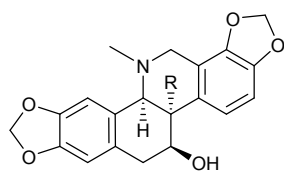
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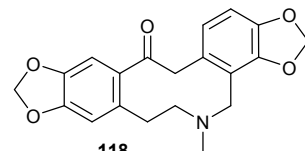
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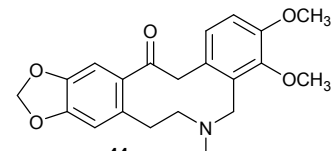
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60 R=H
62 R=CH₃

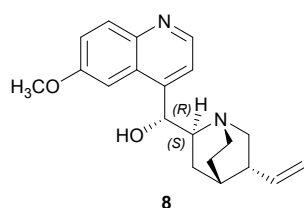


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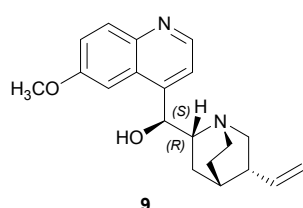


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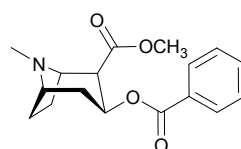
TROPANE ALKALOIDS



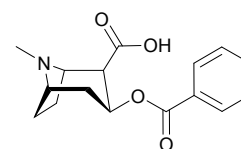
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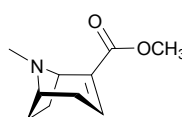
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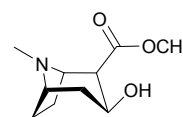
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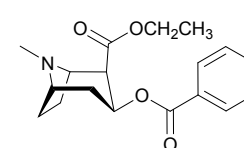
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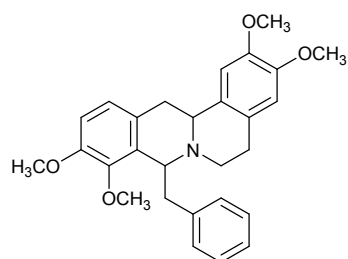


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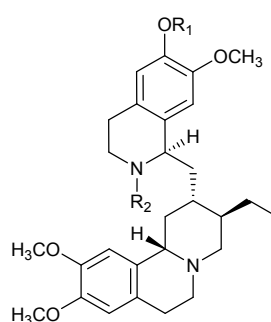


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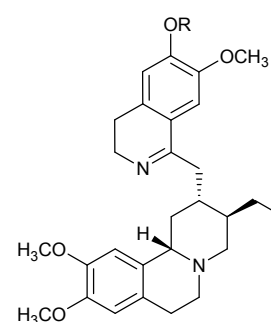
CHINOLIZIDIN ALKALOIDS AND DERIVATIVES



51

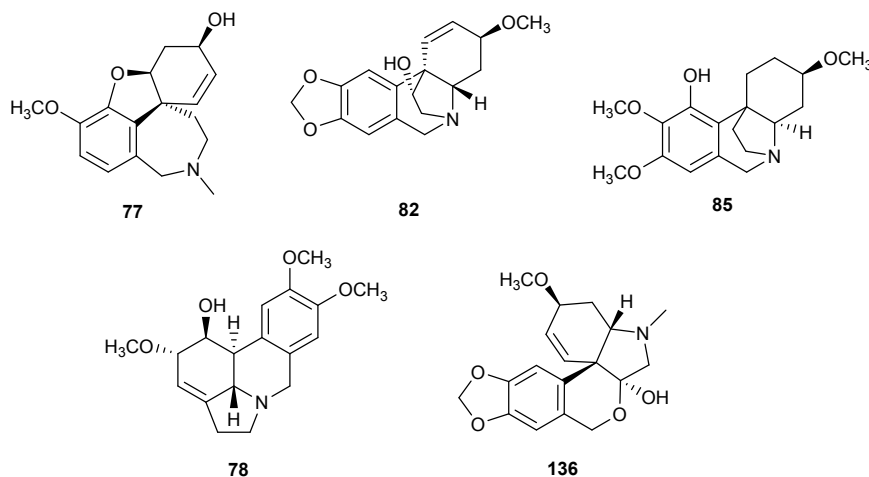


57 R₁=H, R₂=H
72 R₁=CH₃, R₂=H
99 R=CH₃, R₂=CH₃

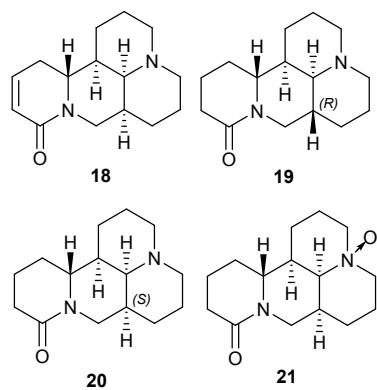


119 R=H
102 R=CH₃

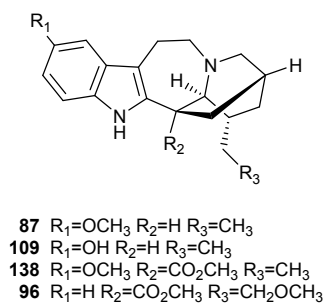
AMARYLLIDACEAE ALKALOIDS



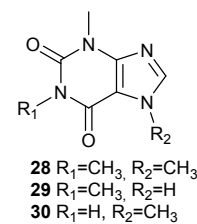
TETRACYCLO-QUINOLIZIDINE ALKALOIDS



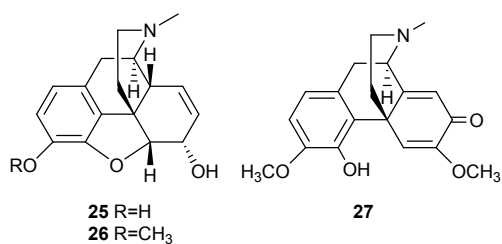
IBOGA ALKALOIDS



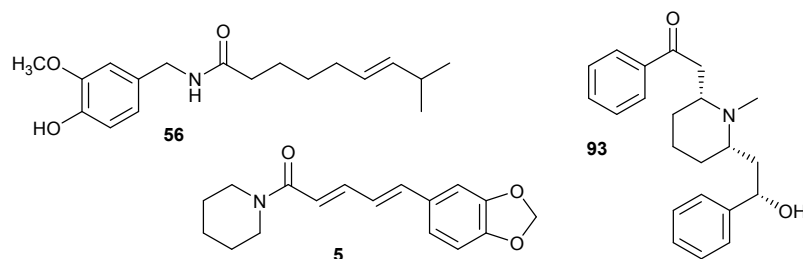
PURINE ALKALOIDS



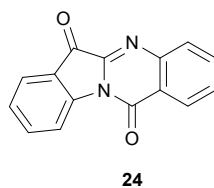
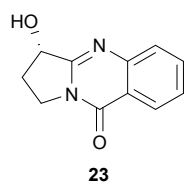
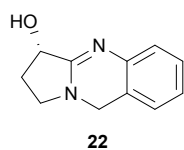
OPIUM ALKALOIDS



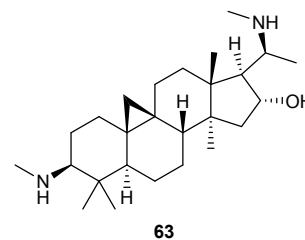
AMIDE & PIPERIDINE ALKALOIDS



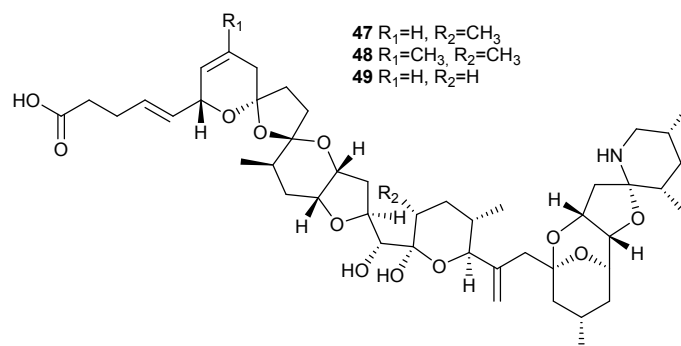
CHINAZOLINE ALKALOIDS



STEROID ALKALOIDS



MARINE ALGAL TOXINS



MISCELLANEOUS ALKALOIDS

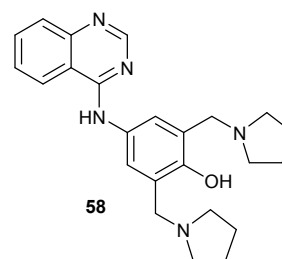
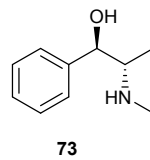
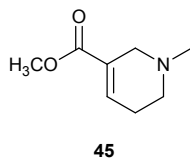
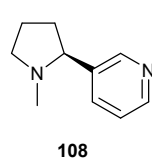
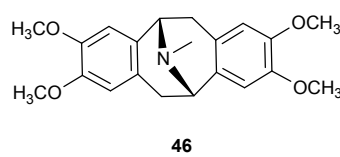
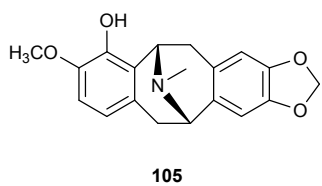
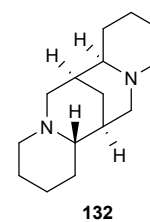
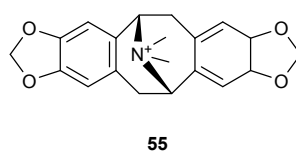
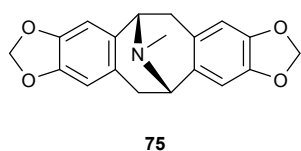
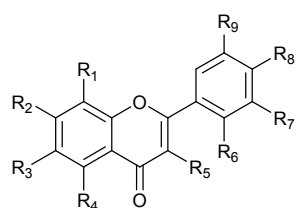
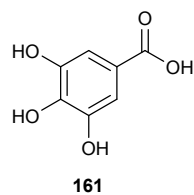
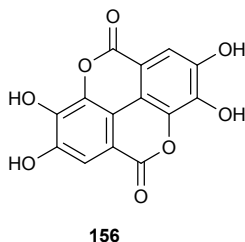
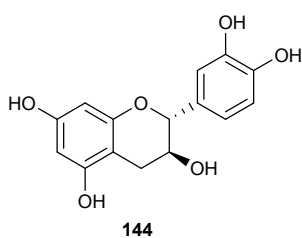
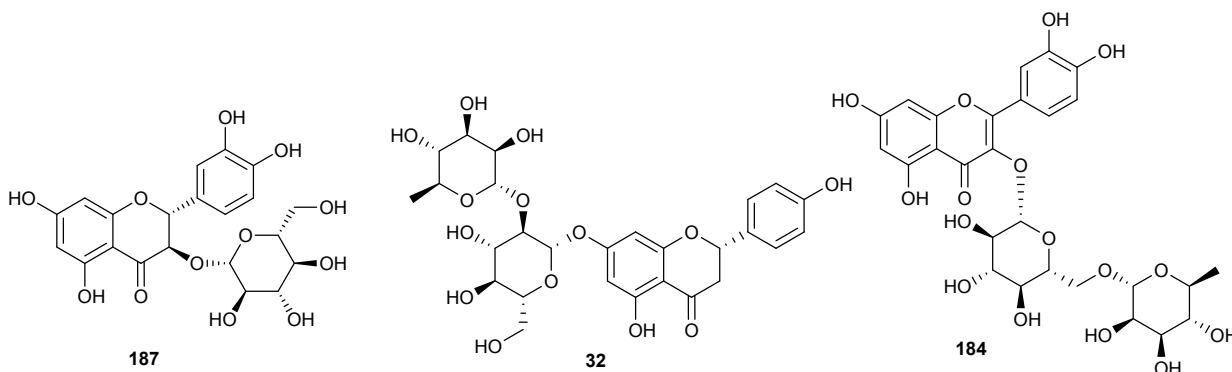
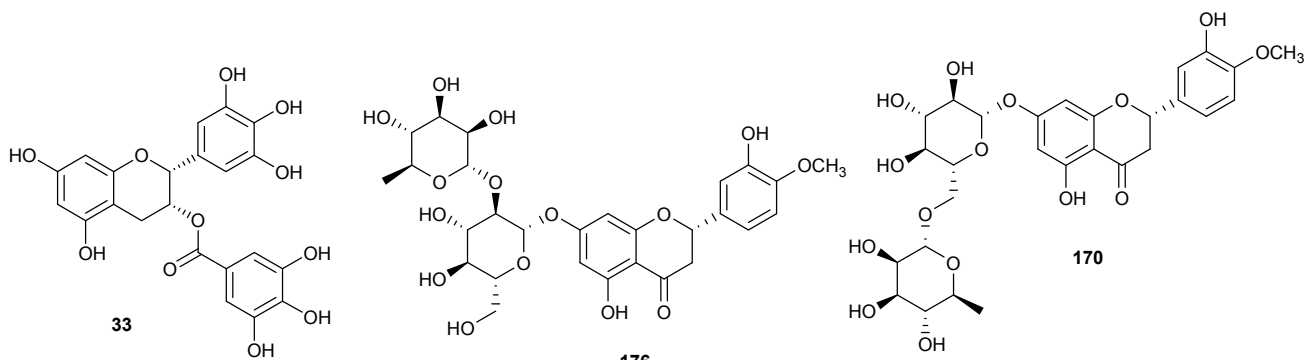
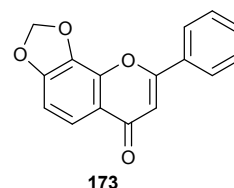
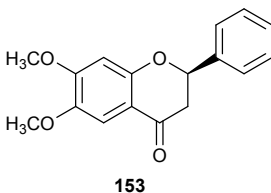
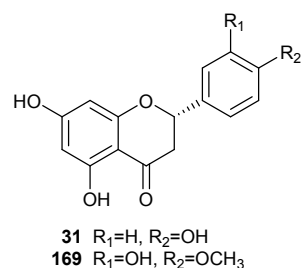


Fig. S2 Non-alkaloid structures of natural compounds tested for hERG channel inhibition (grouped according to structural subclasses).

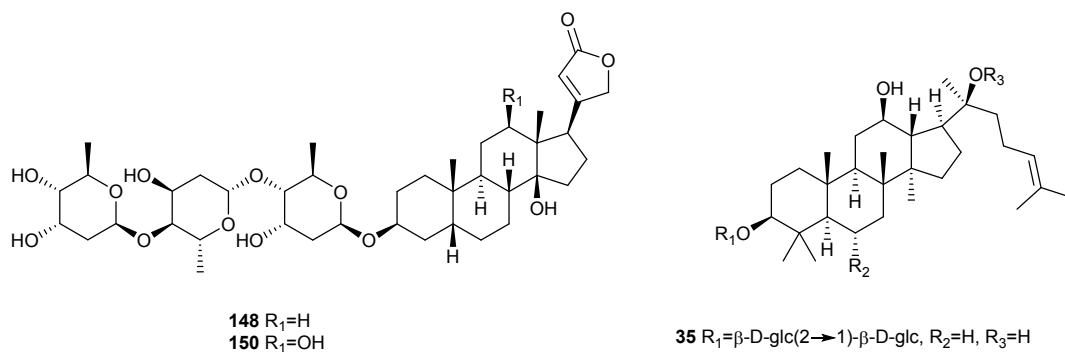
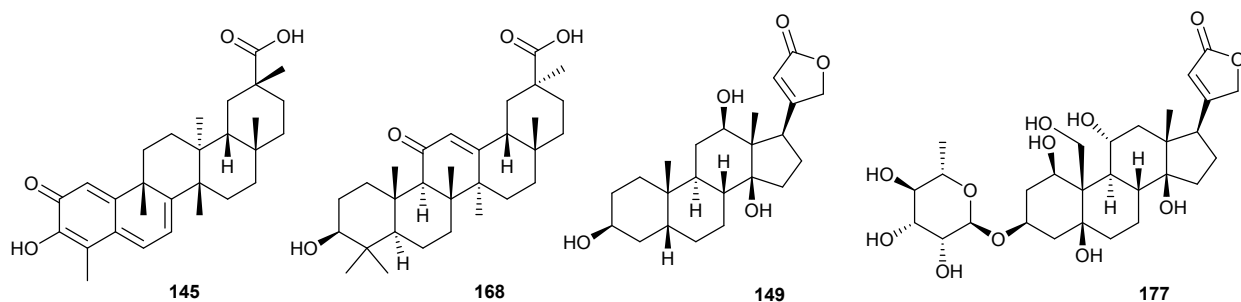
FLAVONOIDS & DERIVATIVES



160 $R_1=H, R_2=OH, R_3=H, R_4=OH, R_5=OH, R_6=H, R_7=H, R_8=H, R_9=H$
174 $R_1=H, R_2=OH, R_3=H, R_4=OH, R_5=OH, R_6=OH, R_8=OH$
175 $R_1=H, R_2=OH, R_3=H, R_4=OH, R_5=OH, R_6=H, R_7=OH, R_8=OH, R_9=OH$
182 $R_1=H, R_2=OH, R_3=H, R_4=OH, R_5=OH, R_6=H, R_7=H, R_8=OH, R_9=OH$
188 $R_1=H, R_2=OCH_3, R_3=H, R_4=OCH_3, R_5=H, R_6=H, R_8=OCH_3$

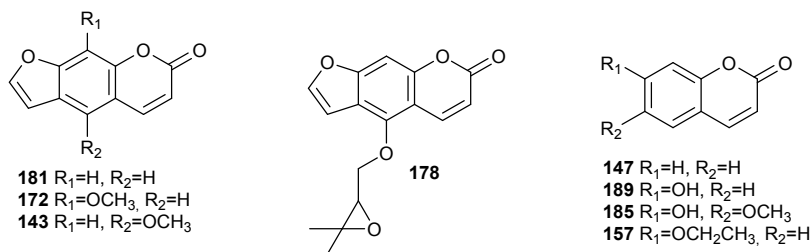


TRITERPENOID & STEROID DERIVATIVES

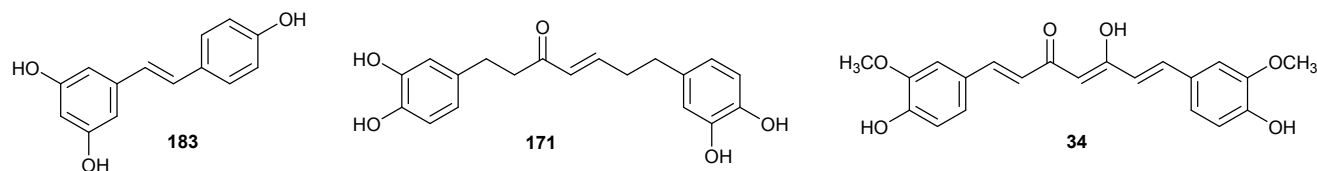


- 162 $R_1=\beta\text{-D-glc}(2\rightarrow 1)\text{-}\beta\text{-D-glc}$, $R_2=H$, $R_3=\beta\text{-D-glc}(6\rightarrow 1)\text{-}\beta\text{-D-glc}$
 163 $R_1=\beta\text{-D-glc}(2\rightarrow 1)\text{-}\beta\text{-D-glc}$, $R_2=H$, $R_3=\beta\text{-D-glc}(6\rightarrow 1)\text{-}\alpha\text{-L-ara}$
 164 $R_1=H$, $R_2=O\text{-}\beta\text{-D-glc}(2\rightarrow 1)\text{-}\alpha\text{-L-rha}$, $R_3=\beta\text{-D-glc}$
 165 $R_1=H$, $R_2=O\text{-}\beta\text{-D-glc}(2\rightarrow 1)\text{-}\beta\text{-D-glc}$, $R_3=H$
 166 $R_1=H$, $R_2=O\text{-}\beta\text{-D-glc}$, $R_3=\beta\text{-D-glc}$
 167 $R_1=\beta\text{-D-glc}$, $R_2=H$, $R_3=H$

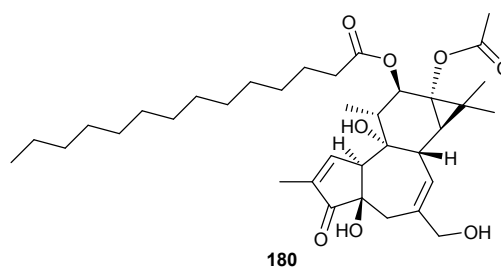
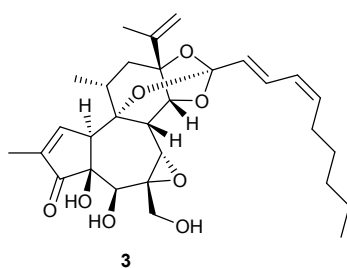
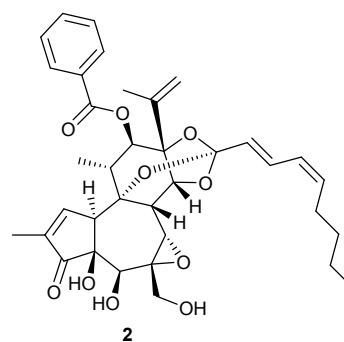
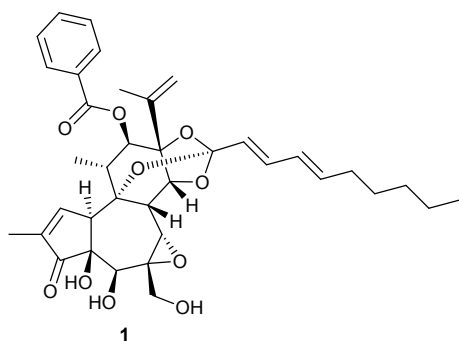
(FURANO)COUMARINS



STILBENES & DIARYLHEPTANOIDS



DITERPENOIDS



MISCELLANEOUS

