New Isoprenylated Flavones and Stilbene Derivative from *Artocarpus hypargyreus*

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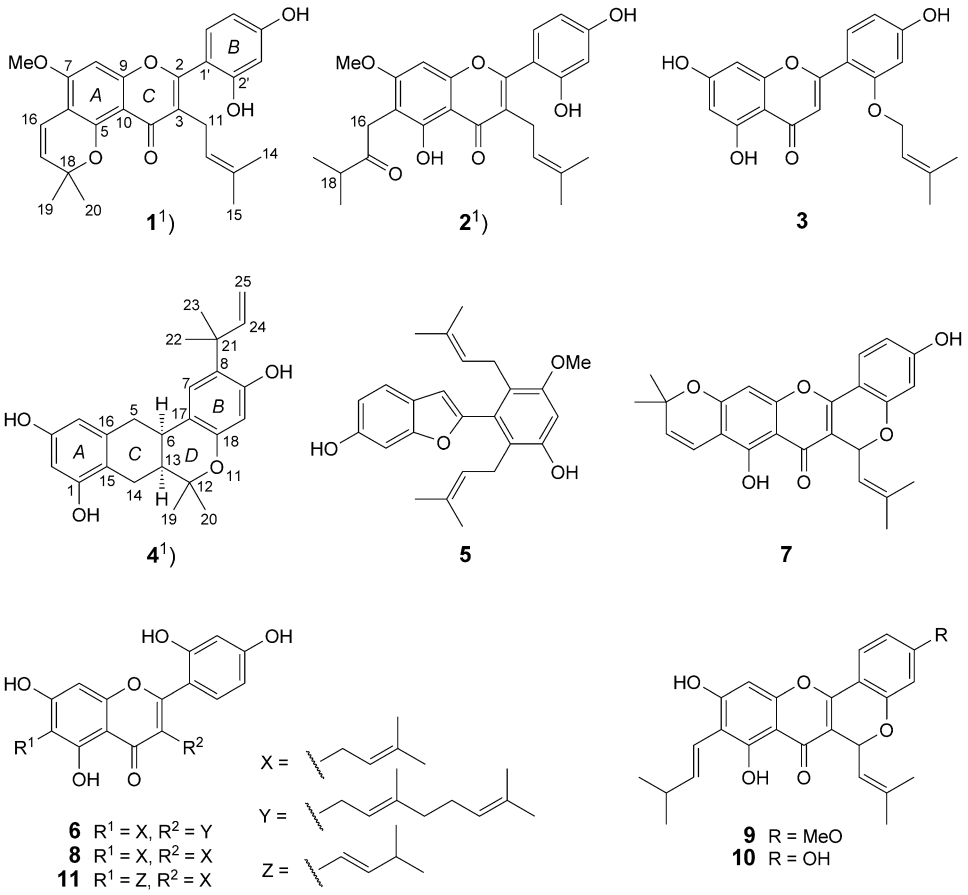
Three new isoprenylated flavones, hypargyflavones A–C (**1**–**3**, resp.), and one novel stilbene derivative, hypargystilbene A (**4**), together with seven known compounds, **5**–**11**, were isolated from the stems of *Artocarpus hypargyreus* HANCE. The structures were elucidated by spectroscopic methods. Hypargyflavone A (**1**), cudraflavone C (**8**), brosimone I (**10**), and norartocarpin (**11**) showed inhibitory effects on pancreatic lipase.

Introduction. – *Artocarpus* species (Moraceae) are widely distributed over tropical regions of Asia, and some plants are used as traditional folk medicines in Indonesia, Thailand, Sri Lanka, and China [1]. Our previous studies on this genus provided a series of isoprenylated flavonoids, 2-arylbenzofurans, and stilbenoids [2], which showed cytotoxicity and inhibitory effects on pancreatic lipase. Pancreatic lipase (PL) is the most important enzyme for dietary lipid absorption, and inhibition of PL is generally regarded as an effective approach for the treatment of obesity [3]. In a program searching for PL inhibitors from natural products, we investigated the chemical constituents of *Artocarpus hypargyreus* HANCE. This plant, an evergreen tree growing in the south of China, has been used to treat rheumatism, headache, and jaundice in China. A few triterpenoids and flavonoids were isolated from this plant previously, such as lupol, methyl betulinate, norartocarpetin, and (+)-catechin [4].

Our preliminary bioassay revealed that the $CHCl_3$-soluble fraction from an EtOH extract of the stems of *A. hypargyreus* exhibited inhibitory effect on PL with an IC_{50} value of 8.6 ± 0.1 μg/ml. Further separation of this fraction afforded three new isoprenylated flavones, hypargyflavones A–C (**1**–**3**, resp.), and one novel stilbene derivative, hypargystilbene A (**4**), together with seven known compounds, mulberrofuran N (**5**) [5], rubraflavone C (**6**) [6], cudraflavones A and C (**7** and **8**, resp.) [7][8], cycloartocarpin A (**9**) [9], brosimone I (**10**) [10], norartocarpin (**11**) [11]. The isolated compounds were tested for PL-inhibitory activity. Here, we report the structure elucidation of compounds **1**–**4** and their biological evaluation.

Results and Discussion. – Hypargyflavone A (**1**), a yellow amorphous powder, was assigned the molecular formula $C_{26}H_{26}O_6$ by HR-EI-MS (*m*/*z* 434.1729 (M^+; calc.



434.1729)). The IR absorptions of **1** implied the presence of OH (3386 cm^{-1}), C=O (1645 cm^{-1}), and aromatic ring (1588, 1464 cm^{-1}) moieties. The ^{1}H-NMR spectrum (*Table 1*) exhibited signals for two OH groups at δ(H) 8.73 (br. *s*, 2 H), a MeO group at δ(H) 3.91 (*s*, 3 H), an aromatic *ABX* spin system at δ(H) 7.13 (*d*, J = 8.3, 1 H), 6.55 (*d*, J = 2.2, 1 H), and 6.48 (*dd*, J = 8.3, 2.2, 1 H), an aromatic *singlet* at δ(H) 6.44 (*s*, 1 H), and signals of a prenyl (= 3-methylbut-2-enyl) side chain at δ(H) 5.11 (br. *t*, J = 7.0, 1 H), 3.04 (br. *d*, J = 7.0, 2 H), and 1.55, 1.38 (2 br. *s*, 3 H each), and of a 2,2-dimethylpyran moiety at δ(H) 6.60 (*d*, J = 10.0, 1 H), 5.63 (*d*, J = 10.0, 1 H), and 1.46 (*s*, 6 H). The ^{13}C-NMR spectrum displayed 26 C-atom signals attributable to one C=O group, eleven quaternary sp^2, seven CH sp^2, one quaternary sp^3, one CH_2 sp^3, and five Me, including one MeO, C-atoms (*Table 2*). These data suggest that **1** is a doubly isoprenylated flavone with one MeO and two OH groups. Analysis of the HMBC data revealed the position of the substituents (*Fig. 1*). The prenyl group was located at C(3), as established by the HMBC correlations from CH_2(11) (δ(H) 3.04) to C(2) (δ(C)

[1]) Arbitrary atom numbering; for systematic names, see *Exper. Part.*

Table 1. *[1]H-NMR Data of Compounds* **1**–**4**. δ in ppm, J in Hz.

Position[1])	**1**[a])[b])	**2**[b])[c])	**3**[a])[b])	**4**[a])[d])
2				6.10 (br. *s*)
3			6.90 (*s*)	
4				6.25 (br. *s*)
5				3.33 (*dd*, *J*=17.2, 2.4), 3.09 (*dd*, *J*=17.2, 5.0)
6			6.21 (*d*, *J*=2.0)	3.38–3.43 (*m*)
7				6.98 (*s*)
8	6.44 (*s*)	6.55 (*s*)	6.46 (*d*, *J*=2.0)	
10				6.25 (*s*)
3′	6.55 (*d*, *J*=2.2)	6.57 (br. *s*)	6.67 (*d*, *J*=2.0)	
5′	6.48 (*dd*, *J*=8.3, 2.2)	6.52 (br. *d*, *J*=8.3)	6.62 (*dd*, *J*=8.7, 2.0)	
6′	7.13 (*d*, *J*=8.3)	7.21 (*d*, *J*=8.3)	7.82 (*d*, *J*=8.7)	
11	3.04 (br. *d*, *J*=7.0)	3.13 (br. *d*, *J*=7.0)	4.70 (br. *d*, *J*=7.0)	
12	5.11 (br. *t*, *J*=7.0)	5.14 (br. *t*, *J*=7.0)	5.55 (br. *t*, *J*=7.0)	
13				2.03 (*ddd*, *J* = 10.6, 7.0, 4.4)
14	1.38 (br. *s*)	1.44 (br. *s*)	1.78 (br. *s*)	2.70 (*dd*, *J*=16.8, 7.0), 2.27 (*dd*, *J*=16.8, 10.6)
15	1.55 (br. *s*)	1.57 (br. *s*)	1.79 (br. *s*)	
16	6.60 (*d*, *J*=10.0)	3.77 (*s*)		
17	5.63 (*d*, *J*=10.0)			
18		2.81 (overlap)		
19	1.46 (*s*)	1.10 (*d*, *J*=6.9)		1.39 (*s*)[e])
20	1.46 (*s*)	1.10 (*d*, *J*=6.9)		1.46 (*s*)[e])
22				1.30 (*s*)[f])
23				1.36 (*s*)[f])
24				6.11 (*dd*, *J*=17.6, 10.6)
25				5.28 (br. *d*, *J*=17.6), 5.21 (br. *d*, *J*=10.6)
7-MeO	3.91 (*s*)	3.89 (*s*)		
5-OH		13.36 (*s*)	13.31 (*s*)	
2′-OH	8.73 (br. *s*)	8.80 (br. *s*)		
4′-OH	8.73 (br. *s*)	8.80 (br. *s*)		

[a]) At 400 MHz. [b]) In (D_6)acetone. [c]) At 500 MHz. [d]) In $CDCl_3$. [e]), [f]) Signals may be exchanged.

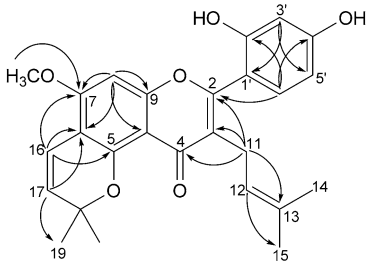


Fig. 1. *Selected HMBC* (H→C) *correlations of* **1**[1])

158.7), C(3) (δ(C) 124.1), and C(4) (δ(C) 176.3). The 2,2-dimethylpyran ring was fused along C(5)–C(6) according to the HMBC correlations from H–C(16) (δ(H)

Table 2. *^{13}C-NMR Data of Compounds* **1**–**4**. δ in ppm.

Position[1])	**1**[a])[b])	**2**[b])[c])	**3**[a])[b])	**4**[a])[d])
1				154.2
2	158.7	162.2	162.4	100.3
3	124.1	122.1	108.9	154.0
4	176.3	183.3	183.1	107.4
5	154.6	159.7	163.0	32.3
6	107.8	107.5	99.7	29.1
7	159.3	164.2	166.1	124.1
8	92.2	90.4	94.7	124.3
9	160.0	158.3	159.0	153.9
10	109.3	105.5	104.7	105.4
1′	113.4	112.9	112.2	
2′	157.1	157.2	160.3	
3′	103.8	103.9	101.7	
4′	161.1	161.7	163.2	
5′	107.9	108.1	109.1	
6′	132.2	132.3	131.2	
11	25.2	24.6	66.3	
12	123.6	122.5	120.1	76.7[e])
13	131.2	132.3	139.0	38.3
14	17.6	17.6	18.3	19.9
15	25.8	25.8	25.8	114.2
16	116.8	34.9		136.5
17	128.4	210.4		113.4
18	77.6	40.5		153.8
19	27.9	18.7		26.3[f])
20	27.9	18.7		26.6[f])
21				39.8
22				27.1[g])
23				26.9[g])
24				148.4
25				113.0
7-MeO	56.5	56.6		

[a]) At 100 MHz. [b]) In (D_6)acetone. [c]) At 125 MHz. [d]) In $CDCl_3$. [e]) Overlapped by $CDCl_3$. [f]), [g]) Signals may be exchanged.

6.60) to C(5) (δ(C) 154.6), C(6) (δ(C) 107.8), and C(7) (δ(C) 159.3), from H–C(17) (δ(H) 5.63) to C(6), and from H–C(8) (δ(H) 6.44) to C(6), C(7), C(9) (δ(C) 160.0), and C(10) (δ(C) 109.3), which was supported by the disappearance of H-bonded HO–C(5) signal and the noticeable upfield shift of C(4) compared to those of 5-hydroxylated flavones [12]. The MeO group was at C(7), as supported by the HMBC correlations from MeO (δ(H) 3.91) to C(7). The 2′,4′-dihydroxylated ring *B* was deduced by the HMBC correlations from H–C(3′) (δ(H) 6.55) to C(1′) (δ(C) 113.4) and C(5′) (δ(C) 107.9), and from H–C(6′) (δ(H) 7.13) to C(2), C(2′) (δ(C) 157.1), and C(4′) (δ(C) 161.1). Thus, the structure of **1** was elucidated as 8-(2,4-dihydroxyphenyl)-5-methoxy-2,2-dimethyl-9-(3-methylbut-2-en-1-yl)-2*H*,10*H*-benzo[1,2-*b*:3,4-*b*′]dipyran-10-one, and **1** was named hypargyflavone A.

Hypargyflavone B (**2**), a yellow amorphous powder, was assigned the molecular formula $C_{26}H_{28}O_7$ by HR-EI-MS (*m/z* 452.1808 (M^+; calc. 452.1835)). The ^{1}H-NMR spectrum showed signals of a H-bonded OH group at δ(H) 13.36 (*s*, 1 H), two OH groups at δ(H) 8.80 (br. *s*, 2 H), a MeO group at δ(H) 3.89 (*s*, 3 H), an aromatic *ABX* spin system at δ(H) 7.21 (*d*, *J* = 8.3, 1 H), 6.57 (br. *s*, 1 H), and 6.52 (br. *d*, *J* = 8.3, 1 H), an aromatic *singlet* at δ(H) 6.55 (*s*, 1 H), and signals of a prenyl group at δ(H) 5.14 (br. *t*, *J* = 7.0, 1 H), 3.13 (br. *d*, *J* = 7.0, 2 H), and 1.57, 1.44 (2 br. *s*, 3 H each). Furthermore, the presence of a 3-methyl-2-oxobutyl group was inferred from the following ^{1}H- and ^{13}C-NMR data: δ(H) 3.77 (*s*, 2 H), 2.81 (overlap), and 1.10 (*d*, *J* = 6.9, 6 H), as well as δ(C) 34.9 (C(16)), 210.4 (C(17)), 40.5 (C(18)), and 18.7 (C(19, 20)) [13]. Comparison of the ^{1}H- and ^{13}C-NMR data of **2** and **1** (*Tables 1* and *2*) indicated that they should have the same rings *B* and *C*, which was confirmed by the HMBC correlations shown in *Fig. 2*. The substitution pattern of ring *A* was deduced from the HMBC correlations from CH_2(16) (δ(H) 3.77) to C(5) (δ(C) 159.7), C(6) (δ(C) 107.5), and C(7) (δ(C) 164.2), from MeO (δ(H) 3.89) to C(7), and from H–C(8) (δ(H) 6.55) to C(6) and C(9) (δ(C) 158.3) (*Fig. 2*). As a result, the 3-methy-2-oxobutyl group was at C(6), and the MeO group was located at C(7). Thus, the structure of **2** was elucidated as 2-(2,4-dihydroxyphenyl)-5-hydroxy-7-methoxy-3-(3-methylbut-2-en-1-yl)-6-(3-methyl-2-oxobutyl)-4*H*-1-benzopyran-4-one, and **2** was named hypargyflavone B.

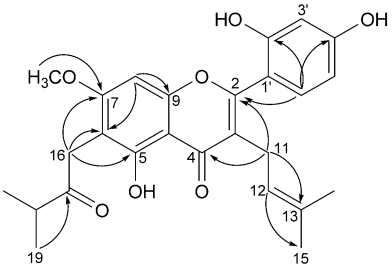


Fig. 2. *Selected HMBC* (H → C) *correlations of* **2**[1])

Hypargyflavone C (**3**), a yellow amorphous powder, was assigned the molecular formula $C_{20}H_{18}O_6$ by HR-EI-MS (*m/z* 354.1098 (M^+; calc. 354.1103)). The ^{1}H-NMR spectrum displayed signals of a H-bonded OH group at δ(H) 13.31 (*s*, 1 H), an aromatic *ABX* spin system at δ(H) 7.82 (*d*, *J* = 8.7, 1 H), 6.67 (*d*, *J* = 2.0, 1 H), and 6.62 (*dd*, *J* = 8.7, 2.0, 1 H), an olefinic *singlet* at δ(H) 6.90 (*s*, 1 H), and signals of two *meta*-coupled aromatic H-atoms at δ(H) 6.46 and 6.21 (2*d*, *J* = 2.0, 1 H each), and an oxygenated prenyl group at δ(H) 5.55 (br. *t*, *J* = 7.0, 1 H), 4.70 (br. *d*, *J* = 7.0, 2 H), and 1.79, 1.78 (2 br. *s*, 3 H each). These NMR data indicated the presence of a 5,7,2′,4′-tetraoxygenated flavone with a prenyl group. The HMBC correlations from CH_2(11) (δ(H) 4.70) to C(2′) (δ(C) 160.3) indicated that the *O*-prenyl group was at C(2′) (*Fig. 3*). Thus, the structure of **3** was elucidated as 5,7-dihydroxy-2-{4-hydroxy-2-[(3-methylbut-2-en-1-yl)oxy]phenyl}-4*H*-1-benzopyran-4-one, and **3** was named hypargyflavone C.

Hypargystilbene A (**4**), an optically active compound ($[\alpha]_D^{20} = -3.7$), was isolated as a yellow amorphous powder. Its molecular formula was deduced as $C_{24}H_{28}O_4$ from

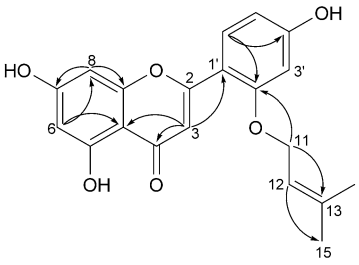


Fig. 3. *Selected HMBC* (H→C) *correlations of* **3**[1])

HR-FAB-MS (*m/z* 381.2048 ($[M+H]^+$; calc. 381.2066)). The IR absorptions of **4** indicated the presence of OH (3418 cm^{-1}) and aromatic ring (1620, 1460 cm^{-1}) moieties. The UV spectrum showed unconjugated aromatic absorptions at 211 and 286 nm [14]. The ^{1}H-NMR spectrum exhibited signals of two *meta*-coupled aromatic H-atoms at δ(H) 6.25 and 6.10 (2 br. *s*, 1 H each) (ring *A*), two aromatic *singlets* at δ(H) 6.98 and 6.25 (2*s*, 1 H each) (ring *B*), and signals of a 1,1-dimethylallyl group at δ(H) 6.11 (*dd*, *J* = 17.6, 10.6, 1 H), 5.28 (br. *d*, *J* = 17.6, 1 H), 5.21 (br. *d*, *J* = 10.6, 1 H), and 1.36 and 1.30 (2*s*, 3 H each). Moreover, analysis of the HMQC and HMBC spectra allowed assignment of the following ^{1}H- and ^{13}C-NMR signals to the fragments of $-CH_2(5)CH(6)CH(13)CH_2(14)-$ and $-CH(13)C(12)(Me_2)O-$: δ(H) 3.38–3.43 (*m*, 1 H), 3.33 (*dd*, *J* = 17.2, 2.4, 1 H), 3.09 (*dd*, *J* = 17.2, 5.0, 1 H), 2.70 (*dd*, *J* = 16.8, 7.0, 1 H), 2.27 (*dd*, *J* = 16.8, 10.6, 1 H), 2.03 (*ddd*, *J* = 10.6, 7.0, 4.4, 1 H), and 1.46 and 1.39 (2*s*, 3 H each), as well as δ(C) 32.3 (C(5)), 29.1 (C(6)), 76.7 (C(12)), 38.3 (C(13)), 19.9 (C(14)), and 26.3, 26.6 (C(19, 20)) (*Fig. 4*). Considering eleven degrees of unsaturation, the two fragments were deduced to derive from a bicyclic moiety (rings *C* and *D*). These NMR signals established that **4** had an isoprenylated tetracyclic ring system.

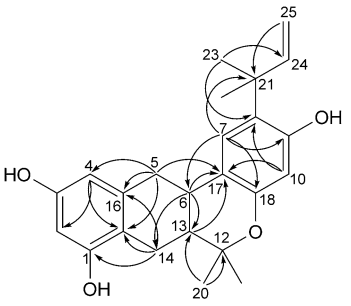


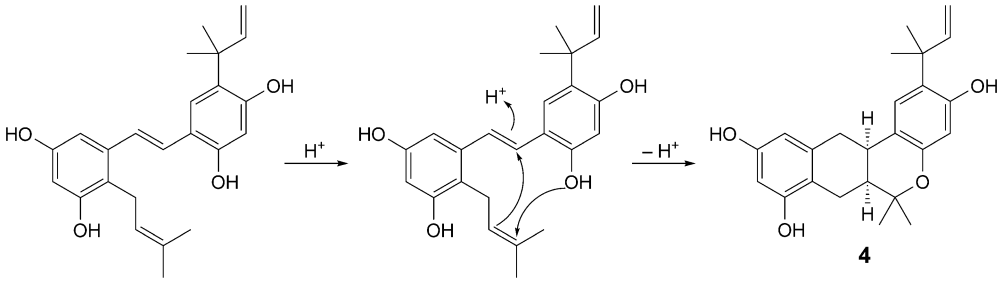
Fig. 4. *Selected HMBC* (H→C) *correlations of* **4**[1])

The structure of **4** was deduced from the HMQC and HMBC data. The moiety of ring *A* was confirmed by the HMBC correlations of H–C(2) and H–C(4) shown in *Fig. 4*. The HMBC correlations were observed from H–C(7) (δ(H) 6.98) to C(9) (δ(C) 153.9), C(18) (δ(C) 153.8), and C(21) (δ(C) 39.8), from H–C(10) (δ(H) 6.25) to C(8) (δ(C) 124.3) and C(17) (δ(C) 113.4), and from two Me(22, 23) (δ(H) 1.30, 1.36) to C(8). These data permitted assignment of the partial structure of ring *B* with the 1,1-dimethylallyl group at C(8). Furthermore, the following HMBC correlations were

detected: from CH_2(5) (δ(H) 3.33, 3.09) to C(4) (δ(C) 107.4), C(15) (δ(C) 114.2), C(16) (δ(C) 136.5), and C(17) (δ(C) 113.4), from H–C(6) (δ(H) 3.38–3.43) and H–C(13) (δ(H) 2.03) to C(17), from H–C(7) to C(6) (δ(C) 29.1), and from CH_2(14) (δ(H) 2.70, 2.27) to C(1) (δ(C) 154.2), C(15), and C(16), which established the connectivity of rings *C* and *D* and indicated the two rings to be attached along C(15)–C(16) and C(17)–C(18), respectively. The configuration of H–C(6) and H–C(13) was assigned as synperiplanar because of the *J*(6,13) value of 4.4 Hz [14]. Thus, the structure of **4** was elucidated as *rel*-(6a*S*,12a*R*)-2-(1,1-dimethylprop-2-en-1-yl)-6a,7,12,12a-tetrahydro-6,6-dimethyl-6*H*-benzo[*b*]naphtho[2,3-*d*]pyran-3,8,10-triol, and **4** was named hypargystilbene A.

Compound **4** is a novel stilbene derivative, and its biogenetic pathway was proposed in the *Scheme*. It is the second compound containing such a skeleton, the other compound is heterophylol isolated from *A. heterophyllus* [14].

Scheme. *Plausible Biogenetic Pathway for* **4**



Compounds **1**–**6** were screened for inhibitory effects on pancreatic lipase (PL). Compound **1** showed significant inhibitory effect on PL with an IC_{50} value of 2.3 ± 0.1 μM, whereas **2**–**6** were inactive. The effects on PL of compounds **7**–**11** were reported by us previously, and **8**, **10**, and **11** were found to inhibit PL; these compounds were isolated from *A. nitidus* [2b]. In these tests, orlistat was used as positive control (IC_{50} = 1.1 ± 0.2 μM).

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Experimental Part

General. Column chromatography (CC): silica gel *H* (200–300 mesh; *Yantai Institute of Chemical Technology*, P. R. China), *Bondesil-C_{18}* gel (40 μm; *Varian Inc.*, USA), *Toyopearl HW-40C* (*Tosoh Co.*, Japan), *Chromatorex RP-18* gel (20–45 μm; *Fuji Silysia Chemical, Ltd.*, Japan), and *Sephadex LH-20* (*GE Healthcare Amersham Biosciences*, Sweden). TLC: Precoated silica gel GF_{254} plates (10–40 μm; *Yantai Institute of Chemical Technology*, China). HPLC: *Agilent 1200* (*Agilent Technologies*, USA), *Sepax Amethyst C_{18}* column (10 × 150 mm, 5 μm; *Sepax Techologies, Inc.*, USA). UV Spectra: *Shimadzu UV-2401PC* spectrophotometer; λ_{max} (log ε) in nm. Optical rotations: *Jasco P1030* polarimeter. IR Spectra: *Nicolet Avatar-360* spectrometer; $\tilde{\nu}$ in cm^{-1}. NMR Spectra: *Bruker DRX-400* and *DRX-500* instruments; δ in ppm rel. to residual solvent peaks of (D_6)acetone (δ(H) 2.04, δ(C) 206.0) and $CDCl_3$

(δ(H) 7.26, δ(C) 77.0); *J* in Hz. EI-MS and HR-EI-MS: *Finnigan MAT 95* mass spectrometer; in *m*/*z* (rel. %). HR-FAB-MS: *VG Autospec-3000* mass spectrometer.

Plant Material. The stems of *A. hypargyreus* HANCE were collected in Hainan Province, P. R. China, in September 2006, and air-dried. The plant was identified by *A.-J. H.*, Fudan University, and a voucher specimen (TCM 2006-09-02 Hou) was deposited with the Herbarium of the Department of Pharmacognosy, School of Pharmacy, Fudan University.

Extraction and Isolation. The dried and powdered roots (4.3 kg) of *A. hypargyreus* were extracted with 95% EtOH (100 l) at r.t. The filtrate was evaporated *in vacuo* to give a residue (350 g), which was suspended in H_2O, and partitioned successively with $CHCl_3$ and AcOEt. The $CHCl_3$ extract (26.0 g) was subjected to CC (SiO_2; petroleum ether (PE)/acetone 10:1, 6:1, 3:1, and 1:1) to afford 14 fractions, *Frs. 1–14*. *Fr. 2* (630 mg) was separated by CC (SiO_2; PE/$CHCl_3$ 3:5) to yield compounds **7** (120 mg) and **11** (5 mg). *Fr. 3* (3.05 g) was separated by CC (SiO_2; PE/$CHCl_3$ 2:5, 1:5, and 0:1) to give three fractions: *Frs. 3.1–3.3*. *Fr. 3.1* (10 mg) was fractionated by prep. HPLC (MeOH/H_2O 4:1, 1.0 ml/min, 210 nm) to afford compound **5** (2 mg; t_R 30 min). *Fr. 3.3* (500 mg) was purified by CC (*Toyopearl HW-40C*; MeOH/H_2O 7:3) to give compound **9** (200 mg). *Fr. 4* (1.63 g) was fractionated by CC (SiO_2; $CHCl_3$/MeOH 8:1 and 4:1), followed by CC (*Sephadex* LH-20; MeOH/H_2O 9:1) to yield compound **8** (30 mg). *Fr. 5* (900 mg) was subjected to CC (SiO_2; $CHCl_3$/MeOH 5:1 and 2:1) to afford eight fractions: *Frs. 5.1– 5.8*. *Fr. 5.5* (20 mg) was purified by CC (SiO_2; $CHCl_3$/MeOH 80:1 and 50:1) and prep. HPLC (MeOH/H_2O 77:23, 1.0 ml/min, 210 nm) to afford compound **2** (3 mg; t_R 35 min). *Fr. 5.7* (500 mg) was separated by CC (*Bondesil-C_{18}*; MeOH/H_2O 7:3) to provide compound **6** (7 mg). *Fr. 10* (700 mg) was separated by CC (SiO_2; $CHCl_3$/MeOH 80:1, 40:1, and 20:1), followed by prep. HPLC (MeOH/H_2O 17:3, 1.0 ml/min, 210 nm) to yield compound **3** (5 mg; t_R 40 min). *Fr. 14* (500 mg) was purified by CC (SiO_2; $CHCl_3$/acetone 4:1), followed by CC (*Chromatorex RP-18* gel; MeOH/H_2O 13:7) to afford compounds **1** (3 mg), **4** (3 mg), and **10** (16 mg).

Hypargyflavone A (=*8-(2,4-Dihydroxyphenyl)-5-methoxy-2,2-dimethyl-9-(3-methylbut-2-en-1-yl)-2*H*,10*H*-benzo[1,2*-b*:3,4*-b*′]dipyran-10-one*; **1**). Yellow amorphous powder. UV (MeOH): 206 (4.41), 280 (3.54). IR (KBr): 3386, 2965, 2925, 1645, 1588, 1464, 1447, 1370, 1351, 1205, 1121, 1083, 847. ^{1}H- and ^{13}C-NMR: see *Tables 1* and *2*, resp. EI-MS: 434 (93, M^+), 419 (32), 401 (39), 391 (100), 379 (24), 361 (16), 281 (12), 217 (33), 207 (37). HR-EI-MS: 434.1729 (M^+, $C_{26}H_{26}O_6^+$; calc. 434.1729).

Hypargyflavone B (=*2-(2,4-Dihydroxyphenyl)-5-hydroxy-7-methoxy-3-(3-methylbut-2-en-1-yl)-6-(3-methyl-2-oxobutyl)-4*H*-1-benzopyran-4-one*; **2**). Yellow amorphous powder. UV (MeOH): 208 (4.40), 260 (3.10), 293 (2.70), 317 (2.61). IR (KBr): 3386, 2921, 2849, 1649, 1616, 1490, 1447, 1386, 1353, 1205, 1140, 1030, 981, 805. ^{1}H- and ^{13}C-NMR: see *Tables 1* and *2*, resp. EI-MS: 452 (18, M^+), 435 (5), 409 (5), 395 (3), 381 (100), 363 (10), 325 (7), 179 (14), 147 (8). HR-EI-MS: 452.1808 (M^+, $C_{26}H_{28}O_7^+$; calc. 452.1835).

Hypargyflavone C (=*5,7-Dihydroxy-2-{4-hydroxy-2-[(3-methylbut-2-en-1-yl)oxy]phenyl}-4*H*-1-benzopyran-4-one*; **3**). Yellow amorphous powder. UV (MeOH): 209 (4.36), 266 (3.72), 348 (3.66). IR (KBr): 3419, 2922, 2851, 1652, 1611, 1569, 1447, 1362, 1257, 1230, 1166, 1023. ^{1}H- and ^{13}C-NMR: see *Tables 1* and *2*, resp. EI-MS: 354 (12, M^+), 339 (10), 311 (8), 299 (8), 286 (100), 269 (11), 258 (5), 229 (4), 153 (26), 134 (8), 69 (16). HR-EI-MS: 354.1098 (M^+, $C_{20}H_{18}O_6^+$; calc. 354.1103).

Hypargystilbene A (= rel-*(6a*S*,12a*R*)-2-(1,1-Dimethylprop-2-en-1-yl)-6a,7,12,12a-tetrahydro-6,6-dimethyl-6*H*-benzo[*b*]naphtho[2,3-*d*]pyran-3,8,10-triol*; **4**). Yellow amorphous powder. $[\alpha]_D^{20} = -3.7$ (*c* = 0.20, MeOH). UV (MeOH): 211 (3.32), 286 (2.83). IR (KBr): 3418, 2925, 1620, 1460, 1424, 1383, 1286, 1158, 1088, 1045. ^{1}H- and ^{13}C-NMR: see *Tables 1* and *2*, resp. EI-MS: 380 (70, M^+), 365 (50), 309 (30), 269 (10), 229 (40), 175 (60), 161 (100), 69 (80). HR-FAB-MS: 381.2048 ($[M+H]^+$, $C_{24}H_{29}O_4^+$; calc. 381.2066).

Assay of Pancreatic-Lipase (PL) Inhibition Activity. The inhibition of PL was determined by measuring the release of 4-nitrophenol from 4-nitrophenyl acetate. The assay was carried out using a method reported in [2b].

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