Supplementary

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Table S1 Main in vitro assays used to assess migration and invasion in NSCLC cells

Assay	Endpoint	Information	Ref.
Migration			
Transwell migration assay (Boyden chamber)	Number of migrated cells	Single-cell migration, chemotaxis	(9-12,24-32,34-40,46,55,56,64,69,71,72,74,79,83,88,89,96,97,99,103,108,109,111,114,122,123,125,127)
Wound-healing (scratch) assay	Migration area/width	Collective migration, EMT	(4, 24, 25, 27 - 32, 34, 39, 45, 46, 48, 50, 51, 53, 54, 56 - 62, 65, 67, 68, 70 - 73, 75, 76, 77, 79 - 81, 83 - 92, 94 - 102, 104 - 114, 116 - 124, 126, 127)
Fence assay	Migration area	Collective migration, EMT	(18)
Time-lapse cell tracking	Cell migration path	Collective or single-cell migration	(19,20,63)
Cell exclusion zone assay	Migration area	Collective migration, EMT	(19,21,22,66)
Spheroid migration assay	Migration area	Migration from cell cluster	(23)
Invasion			
Transwell invasion assay (Boyden chamber)	Number of invasive cells	Single-cell invasion through ECM	(4,11,12,25-29,31,32,34-40,45,46,48,50-55,57,59,60,62-64,67,68,71,73-77,79,80-89,92-103,105,109,110-113,115,117,120-127)
Spheroid invasion assay	Invasion area	Single or collective invasion from cluster	(21,47)
3D cell tracking	Invasion distance	Single-cell invasion	(47)
Gelatin zymography	Zymograms	MMPs activity	(26,28,40,45,46,62,77,79,91,98,102,114,119,123)

3D, three-dimensional; EMT, epithelial to mesenchymal transition; ECM, extracellular matrix; MMPs, matrix metalloproteinases

Table S2 Overview of in vitro studies on migration and invasion of NSCLC cells exposed to lung carcinogens and other toxic contaminants

Group Carcinogen/Contaminant NSCLC cell line Methodology (concentrations used*) Key findings** Ref. Tobacco smoke B(a)P A549 Transwell migration and invasion assays (10 nM and 1,000 nM) B(a)P significantly increased cell migration and invasion through up-regulating IL-8, CCL2, and CCL3 expression (55) A549, YTMLC Wound-healing assay B(a)P increased the number of metastatic cells and TNF-α had a role in this development (56) Cadmium A549 Wound-healing assay (10 µM and 20 µM) Notch1, along with HIF-1α and IGF-1R/Akt/ERK/S6K1 signalling pathways, promote malignant progression stimulated by Cd (58) Transwell migration and invasion assays (2 µM) Upregulation of HMGA2 plays an important role in Cd-enhanced migration and invasion (37) Transwell migration and invasion assays (0.5 µM and 1 µM) Cd induced an increase in cell migration and invasion by promoting autophagy (38) Wound-healing assay Transwell invasion assay (0.5 µM and 1 µM) Termswell invasion assay (0.5 µM and 1 µM) (57)
Tobacco smoke B(a)P A549 Transwell migration and invasion assays (10 nM and 1,000 nM) B(a)P significantly increased cell migration and invasion through up-regulating IL-8, CCL2, and CCL3 expression (55) A549, YTMLC Wound-healing assay B(a)P increased the number of metastatic cells and TNF-α had a role in this development (56) Transwell migration assay (1, 2, 5, 10 and 20 µM) Notch1, along with HIF-1α and IGF-1R/Akt/ERK/S6K1 signalling pathways, promote malignant progression stimulated by Cd (58) Transwell migration and invasion assays (2 µM) Upregulation of HMGA2 plays an important role in Cd-enhanced migration and invasion (37) Transwell migration and invasion assays (0.5 µM and 1 µM) TGIF might play a crucial role in invasion and migration of cells exposed to Cd (57)
A549, YTMLC Wound-healing assay B(a)P increased the number of metastatic cells and TNF-α had a role in this development (56) Transwell migration assay (1, 2, 5, 10 and 20 µM) Transwell migration assay (10 µM and 20 µM) Notch1, along with HIF-1α and IGF-1R/Akt/ERK/S6K1 signalling pathways, promote malignant progression stimulated by Cd (58) Transwell migration and invasion assays (2 µM) Upregulation of HMGA2 plays an important role in Cd-enhanced migration and invasion (37) Transwell migration and invasion assays (0 µM and 1 µM) Cd induced an increase in cell migration and invasion by promoting autophagy (38) Wound-healing assay (0.5 µM and 1 µM) Transwell migration and invasion assays (0.5 µM and 1 µM) (57)
Transwell migration assay (1, 2, 5, 10 and 20 μM) Notch1, along with HIF-1α and IGF-1R/Akt/ERK/S6K1 signalling pathways, promote malignant progression stimulated by Cd (58) Cadmium A549 Wound-healing assay (10 μM and 20 μM) Notch1, along with HIF-1α and IGF-1R/Akt/ERK/S6K1 signalling pathways, promote malignant progression stimulated by Cd (58) Transwell migration and invasion assays (2 μM) Upregulation of HMGA2 plays an important role in Cd-enhanced migration and invasion (37) Transwell migration and invasion assays (not stated) Cd induced an increase in cell migration and invasion by promoting autophagy (38) Wound-healing assay Transwell invasion assay (0.5 μM and 1 μM) Transwell invasion assay (0.5 μM and 1 μM) (57)
CadmiumA549Wound-healing assay (10 μM and 20 μM)Notch1, along with HIF-1α and IGF-1R/Akt/ERK/S6K1 signalling pathways, promote malignant progression stimulated by Cd(58)Transwell migration and invasion assays (2 μM)Upregulation of HMGA2 plays an important role in Cd-enhanced migration and invasion(37)Transwell migration and invasion assays (not stated)Cd induced an increase in cell migration and invasion by promoting autophagy(38)Wound-healing assayWound-healing assay (0.5 μM and 1 μM)TGIF might play a crucial role in invasion and migration of cells exposed to Cd(57)
Transwell migration and invasion assays (2 µM)Upregulation of HMGA2 plays an important role in Cd-enhanced migration and invasion(37)Transwell migration and invasion assays (not stated)Cd induced an increase in cell migration and invasion by promoting autophagy(38)Wound-healing assayTGIF might play a crucial role in invasion and migration of cells exposed to Cd(57)Transwell invasion assay (0.5 µM and 1 µM)Tene to the the the transmitter to the the transmitter to th
Transwell migration and invasion assays (not stated)Cd induced an increase in cell migration and invasion by promoting autophagy(38)Wound-healing assayTGIF might play a crucial role in invasion and migration of cells exposed to Cd(57)Transwell invasion assay (0.5 µM and 1 µM)Tenent to the total control to the
Wound-healing assay TGIF might play a crucial role in invasion and migration of cells exposed to Cd (57) Transwell invasion assay (0.5 µM and 1 µM)
Transwell invasion assay (0.5 μM and 1 μM)
Transwell migration and invasion assays (0.5 μ M and 2 μ M) Exposure to Cd increased the expression of p-ERK, enhancing migration and invasion (35)
Nicotine A549, H1299 Transwell invasion assay (100 µg/mL) Nicotine promoted cell migration through upregulation of LINC00460 (52)
A549 Wound-healing assay Nicotine induced proliferation, invasion, and migration of tumor cells through the mediation of α 7-nAChRs (50)
Transwell invasion assay (0.01, 0.1 and 1 μ M)
A549, H1650 Wound-healing assay ID1, after induction by nicotine, promoted migration and invasion by increasing the expression of <i>STMN3</i> and <i>GSPT1</i> genes (51)
Transwell invasion assay (1 µM)
NNKH1299Wound-healing assayNNK activated the c-Src/PKCt/FAK loop, which promoted metastasis(53)
Cell migration assay kit
Transwell invasion assay (100 pM)
A549, H157 Wound-healing assay Twist protein and mRNA expression were increased by NNK, and it was necessary for NNK promotion of migration and invasion (54)
Transwell invasion assay (2 and 5 μ M)
Air pollution BPA A549 Wound-healing assay BPA can promote the <i>in vitro</i> migration and invasion via upregulation of MMPs and GPER/EGFR/ERK1/2 signals (34)
Transwell migration and invasion assays (10 μM)
Transwell invasion assay Snail-1/Cx43/ERRγ was identified as a novel signalling pathway through which BPA promoted metastasis (63)
Time-lapse cell tracking (10, 50, 100, 300 nM and 10 μM)
gNO A549 Wound-healing assay gNO promoted metastasis through a mechanism involving the iNOS-dependent MMP-2 activity (62)
Transwell invasion assay
Gelatin zymography (1.0, 2.5, and 5.0 μM)
Oxy-PAHs A549 Wound-healing assay Exposure to Oxy-PAHs (9-fluorenone) induced invasion and migration of cells by the activation of EMT (24)
Transwell migration assay (0.16, 0.8, 4, 20 and 100 μM)
PM2.5 exposure induced ROS, which activates loc146880 expression. The IncRNA, in turn, up-regulates autophagy and promotes (59)
Transwell invasion assay (16 µg/cm ²) malignant behaviour. Both loc146880 and autophagy promoted cell migration, invasion, and EMT
A549, H1299 Wound-healing assay (50 μ g/cm ²) PM2.5 exposure induced proliferation and motility (61)
H1299, H520 Wound-healing assay Cell migration, invasion, EMT and autophagy were enhanced when cells were treated with cigarette smoke extract and PM2.5 alone or (60)
Transwell invasion assay (25 µg/cm ²) in combination
Other AFB1 A549 Wound-healing assay (2.5 µM) AFB1 promoted cell migration through upregulation of IRS2 via induction of Src phosphorylation (65)
Arecoline A549, H520, H460 Cell exclusion zone assay (40 µM) Arecoline stimulated cell migration by activating the EGFR/c-Src/FAK signalling pathway via mAChR3 (66)
Isoflurane A549, H1299 Wound-healing assay Isoflurane activated the Akt-mTOR signalling pathway resulting in the promotion of cells' proliferation. migration. and invasion (67)
Transwell invasion assay (1 and 2%)
Riboflavin A549, H3255, Calu-6 Transwell migration and invasion assays (50, 100, 200 and 400 µM) Riboflavin at higher doses increased cell growth as well as invasion and migration (64)

α7-nAChRs, alpha-7 nicotinic receptor; Akt, protein kinase B; AFB1, aflatoxin B1; B(a)P, Benzo(a) pyrene; BPA, Bisphenol A; CCL2, chemokine (C-C motif) ligand 2; CCL3, Chemokine (C-C motif) ligand 3; Cd, Cadmiun; c-Src, Proto-oncogene tyrosine-protein kinase Src; Cx43, connexin 43; EGFR, epidermal growth factor receptor; EMT, epithelial to mesenchymal transition; ERK, extracellular-signal-regulated kinase; ERRγ, estrogen related receptor gamma; FAK, focal adhesion kinase; gNO, nitric oxide (gaseous); GPER, G protein-coupled estrogen receptor; GSPT1, G1 To S Phase Transition 1; HIF-1α, Hypoxia-inducible factor 1-alpha; HMGA2, high mobility group A2; ID1, Inhibitor of DNA binding/Differentiation 1; IGF-1R, Insulin-like growth factor 1 receptor; IL-8, interleukin 8; iNOS, nitric oxide synthase (inducible isoform); IRS, insulin receptor substrate; IncRNA, long non-coding RNA; mAChR3, muscarinic acetylcholine receptor 3; MMP, matrix metalloproteinase; mTOR, mammalian target of rapamycin; NNK, Nitrosamine 4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone; PAHs, Polycyclic aromatic hydrocarbons; PKCi, protein kinase C; PM2.5, particulate matters with less than 2.5 µm of diameter; S6K1, Ribosomal protein S6 kinase beta-1; STMN3, Stathmin like 3; TGIF, transforming growth interacting factor; TNF-α, Tumor necrosis factor α. *In some reports not all the concentrations indicated in this table were used for all the migration/invasion experiments. **Herein are presented the key findings reported by the authors related to migration/invasion and underlying mechanisms, using essentially migration/invasion related-assays. Nonetheless, some of these findings were obtained using other methodologies not provided in this table. In the original manuscript, other findings not related to migration/invasion and underlying mechanisms, using essentially migration/invasion related-assays. Nonetheless, some of these findings were obtained using other methodologies not provided in this table. In the original manuscript, other findings not rel

Table S3 Overview of in vitro studies on migration and invasion of NSCLC cells exposed to natural bioactive compounds

			Methodology (concentrations used)*	Key findings**	Ref.
Polyphenols non-flavonoids	Curcumin	801D	Wound-healing assay Transwell invasion assay (10 $\mu\text{M})$	Low toxicity levels of curcumin suppressed migration and invasion through inhibition of Rac1/PAK1 signalling pathway and MMP-2/9 expression	(68)
		A549 H226	Transwell migration assay (5 and 10 μ M)	Curcumin suppressed proliferation and migration via inhibition of EGFR and the TLR4/MyD88 pathway	(69)
	Ephemeranthol A	H460	Wound-healing assay (10, 50 and 100 µM)	Ephemeranthol A suppressed migration and EMT by decreasing N-cadherin, vimentin, and Slug as	(70)
				well as inhibiting the activation of FAK and Akt	
	Honokiol	A549, H460, H226, H1299	Wound-healing assay Transwell migration and invasion assays (5, 10 and 20 $\mu\text{M})$	Honokiol suppressed migration by inhibition of PGE $_2$ and COX-2, leading to the inactivation of the β -catenin signalling pathway	(71)
		A549, H460	Wound-healing assay Transwell migration assay (30 μ M)	Honokiol inhibited migration and EMT by targeting c-FLIP, resulting in the suppression of N-cadherin and Snail	(72)
		A549	Transwell migration assay (45 μM)	miR-148a-5p and miR-148a-3p are potential biomarkers of honokiol-treated cells and, consequently, inhibited	(9)
	Manaifarin	A540 H460 H520	Wound booling accountranswell migration account (25 up/ml.)	proliferation and migration, and induced apoptosis	(30)
	Mangirerin	A549, H460, H520	wound-nealing assay transwell migration assay (25 µg/mL)	Nangiterin inhibited migration, regulated EMT by upregulating the expression of PERT, mediated LPS-induced NLRP3 inflammasome expression, and the production of inflammatory cytokines	(30)
	Phoyunnanin E	H460, H292, A549	Wound-healing assay Transwell invasion assay (1, 5 and 10 $\mu\text{M})$	Phoyunnanin E inhibits the motility of cells via the suppression of EMT, migratory-associated integrins αv and $\beta 3$, and FAK/Akt signals which in turn suppress downstream migratory proteins	(73)
	Resveratrol	A549	Transwell migration and invasion assays (50 μ M)	Resveratrol inhibited proliferation, migration, invasion, and promoted apoptosis by inhibiting the expression of STAT-3	(74)
			Wound-healing assay Transwell invasion assay (25 μ M)	Resveratrol-induced Rad9 expression (mediated by DNA damage and ROS), significantly suppressed proliferation,	(75)
	Rottlerin	A549	Wound-healing assay Transwell invasion assay (1 and 3 µM)	Rottlerin hampered migration and invasion by inhibiting the expression of TAZ	(76)
					()
Flavonoids	Acacetin	A549	Wound-healing assay Transwell invasion assay Gelatin zymography (1, 2.5 and 5 $\mu\text{M})$	Acacetin inhibited migration and invasion by preventing p38a phosphorylation via the MKK3/6 and/or the MLK3 signaling pathways. Additionally, it inhibited NF-kB and AP-1, causing suppression of MMP-2/9 and u-PA	(77)
				expression	
	Atalantraflavone	A549, 95D	Cell Migration Assay Kit (10, 25 and 50 $\mu\text{M})$	AFL suppressed NSCLC progression by inhibiting migration through Twist1	(78)
	Anthocyanins	A549	Transwell migration and invasion assays	Anthocyanins decreased the expression of MMP-2, u-PA, TIMP-2, and PAI, causing the inhibition of migration and	(40)
			Gelatin zymography (25, 50 and 100 μ M)	invasion in a dose-dependent manner	
		H1299	Wound-healing assay Transwell migration and invasion assays	P3G inhibited invasion, motility, and secretion of MMP-2/9, and u-PA. These inhibitory effects might occur due to the inactivation of ERK 1/2 and AP-1 signalling pathways	(79)
			Gelatin zymography (10, 20 and 40 µM)		
			Wound-healing assay Transwell migration and invasion assays	The combination of anthocyanidins synergistically inhibited cell growth, invasion, and migration, and promoted cell-cycle arrest and apoptosis when compared to individual anthocyanins	(25)
			(0.25 µM) of individual antitocyanians of their equinicial mixture $3.12, 6.25$ and $12.5 µM)$		(00)
	Artonin E	A549, H460, H292, H23	(0.05, 0.1, 0.25, 0.5 μ g/mL)	Artonin E inhibited migration and invasion via suppression of activated FAK, downstream-activated Akt, and CDC42	(80)
	BIO-A	A549	Transwell invasion assay (20, 40 and 80 $\mu\text{M})$	BIO-A inhibited proliferation through down-regulating Ki-67 and VEGF, induced apoptosis by activation of Caspases-3 and 9, and suppressed cell migration by downregulating MMP-2 and VEGF	(82)
	Cycloartobiloxanthone	H460	Wound-healing assay Transwell invasion assay	Cycloartobiloxanthone inhibited migration and invasion by suppressing several migratory-regulated mechanisms	(81)
	Dequelin	H292	(1, 5 and 10 μM) Wound-healing assay Transwell migration and invasion assays	Including FAK and CDC42 signaling, decreasing integrin α 5, α v, and β 3 levels, and inhibiting EMT	(83)
	Degueini	THE SE	(0.5, 1.5 and 2.5 μ M)	resulting in the down-regulation of MMP-2/9 and uPA	(00)
		H23, H1299, A549	Wound-healing assay Transwell invasion assay (200 and 500 nM)	Deguelin inhibits cell migration and invasion and by suppressing CtsZ expression and its downstream FAK/Src/ Paxillin signaling	(84)
	ECG	A549	Wound-healing assay	ECG suppressed TGF- β -induced EMT and invasion of cells by reducing expression levels of fibronectin, p-FAK, MMP-2 and u-PA	(46)
			Transwell migration and invasion assays		
	EGCG	A549	Wound-healing assay Transwell invasion assav	EGCG inhibited TGF- β -induced EMT via downregulation of phosphorvlated Smad2 and FBK1/2	(85)
	Pa	4510	(5, 10 and 20 μM)		
	Fisetin	A549	Wound-healing assay Transwell migration and invasion assays	FIS suppressed adhesion, migration, and invasion via inhibition of ERK1/2 and downregulation of MMP-2 and u-PA at both protein and mRNA expression levels	(28)
			Gelatin zymography (1, 5 and 10 μM)		
			Wound-healing assay Transwell invasion assay (10 and 40 $\mu\text{M})$	FIS suppressed proliferation, migration, adhesion, and invasion	(48)
			Wound-healing assay Transwell invasion assay (10 µM)	The combination of FIS and paclitaxel significantly reduced cancer cell migration and invasion through a marked	(86)
				rearrangement of actin and vimentin cytoskeleton and the modulation of metastasis-related genes	
		A549, H1299	Wound-healing assay Transwell invasion assay (5 and 10 $\mu\text{M})$	FIS significantly inhibited migration, invasion and EMT through up-regulation of E-cadherin, ZO-1 and downregulation of vimentin, N-cadherin and MMP-2	(4)
	Genistein	A549, H460	Wound-healing assay Transwell invasion assay (20 and 40 $\mu\text{M})$	Genistein inhibited migration and invasion	(87)
	Hesperidin	A549, H460, H1975	Wound-healing assay Transwell migration and invasion assays	Hesperidin inhibited the migratory and invasive capabilities by mediating the SDF-1/CXCR-4 signalling pathway	(88)
	Hydroxysafflor yellow A	4549 H1299	(25, 37.5, 50 and 62.5 μg/mL) Wound-healing assay Transwell migration and invasion assays	HVSA inhibited migration, invasion, and EMT by suppressing PI3K/Akt/mTOB and ERK/MAPK signaling pathways	(89)
	Hydroxysamor yellow A	N040, 111200	(5, 10 and 20 μ M)		(00)
	Luteolin	A549	Wound-healing assay (50 μM)	Luteolin disrupted cell migration through the prevention of stress fiber formation	(90)
	Morin	A549	Transwell migration assay (50 μM)	Morin decreased cell viability, colony formation, and migration rate through the downregulation of miR-135b that directly targets and represence CONG2	(10)
	Myricetin	A549	Wound-healing assay Gelatin zymography (50 and 100 µM)	Myricetin inhibited migration by reducing MMP-2/9 expressions via inhibition of the FAK/ERK signaling pathway	(91)
	Quercetin	A549, HCC827	Wound-healing assay Transwell migration and invasion assays (10, 25 and 50 $\mu\text{M})$	Quercetin inhibited metastasis by suppressing the Shail-mediated EMI	(31)
	Scutellaria Flavonoids	A549, H1299	Transwell invasion assay (80 μM)	Baicalein significantly inhibited cell invasion and EMT by upregulating the mRNA and protein expression of E-cadherin and downregulating the Twist1 and Vimentin expression	(93)
			Wound-healing assay Transwell invasion assay	Baicalin, baicalein, and wogonin activated Rap1-GTP binding and dephosphorylated Akt and Src by suppressing	(94)
		A549, 95D	(baicalin 200 μM, baicalein 10 μM and wogonin 40 μM) Wound-healing assay Transwell invasion assay (4, 8, 16 μM)	a7nAChR, consequently triggering inhibition of Id1 and thus blocking proliferation, EMT, and angiogenesis	(92)
				signalling pathway	(02)
	Sotetsuflavone	H1650	Wound-healing assay Transwell invasion assay (64 and 128 μM)	Sotetsuflavone was able to inhibit proliferation, migration, and invasion	(95)
	Ohmusatahihaamul		Wound-healing assay Transwell migration and invasion assays	Obvious tablibution of the standard structure of the standard structure of the standard structure of SMT	(07)
Bibenzyls	Chrysotobibenzyi	H460, H292	(1.5, 10 and 50 µM)	Chrysotobibenzyl inhibited cell migration via depletion of Cav-1, integrins p1, p3, and av and also suppressed EMT	(27)
Bibenzyls	Gigantol	H460, H292 H460, H292	(1, 5, 10 and 50 μM) Wound-healing assay Transwell migration and invasion assays	Gigantol suppressed the migratory behaviour through a Cav-1-dependent pathway.	(27)
Bibenzyls	Gigantol	H460, H292 H460, H292	(1, 5, 10 and 50 μ M) Wound-healing assay Transwell migration and invasion assays (5, 10 and 20 μ M)	Gigantol suppressed the migratory behaviour through a Cav-1-dependent pathway.	(29)
Bibenzyls	Gigantol	H460, H292 H460, H292 H460	(1, 5, 10 and 50 μ M) Wound-healing assay Transwell migration and invasion assays (5, 10 and 20 μ M) Wound-healing assay Transwell migration and invasion assays (1, 5, 10 and 20 μ M)	Gigantol suppressed EMT, resulting in a reduction of migration	(29) (96)
Bibenzyls	Gigantol Moscatilin	H460, H292 H460, H292 H460 H23	 Wound-healing assay franswell migration and invasion assays (1, 5, 10 and 50 μM) Wound-healing assay Transwell migration and invasion assays (5, 10 and 20 μM) Wound-healing assay Transwell migration and invasion assays (1, 5, 10 and 20 μM) Wound-healing assay Transwell migration and invasion assays (0.25, 0.5 and 1 μM) 	Gigantol suppressed the migration via depietion of Cav-1, integrins p1, p3, and av and also suppressed EMT Gigantol suppressed EMT, resulting in a reduction of migration Moscatilin inhibited cell migration and invasion through attenuation of endogenous ROS	(29) (96) (97)
Bibenzyls	Gigantol Moscatilin Riccardin D	H460, H292 H460, H292 H460 H23 A549	Wound-healing assay Transwell migration and invasion assays (1, 5, 10 and 50 μ M) Wound-healing assay Transwell migration and invasion assays (5, 10 and 20 μ M) Wound-healing assay Transwell migration and invasion assays (1, 5, 10 and 20 μ M) Wound-healing assay Transwell migration and invasion assays (0.25, 0.5 and 1 μ M) Wound-healing assay Transwell invasion assay Gelatin Zymography	 Chrysotobibenzyi inhibited cell migration via depletion of Cav-1, integrins p1, p3, and av and also suppressed EMT Gigantol suppressed the migratory behaviour through a Cav-1-dependent pathway. Gigantol suppressed EMT, resulting in a reduction of migration Moscatilin inhibited cell migration and invasion through attenuation of endogenous ROS The ability of invasion and migration was suppressed upon exposure to riccardin D, and MMP-2/9 levels were 	(29) (96) (97) (98)
Bibenzyls	Gigantol Moscatilin Riccardin D	H460, H292 H460, H292 H460 H23 A549 H292	 Wound-healing assay transwell migration and invasion assays (1, 5, 10 and 50 μM) Wound-healing assay Transwell migration and invasion assays (5, 10 and 20 μM) Wound-healing assay Transwell migration and invasion assays (1, 5, 10 and 20 μM) Wound-healing assay Transwell migration and invasion assays (0.25, 0.5 and 1 μM) Wound-healing assay Transwell invasion assay Gelatin Zymography (2.5, 5, 10 and 20 μM) Wound-healing assay Transwell migration and invasion assays 	 Chrysotobibenzyl inhibited cell migration via depletion of Cav-1, integrins β1, p3, and αv and also suppressed EM1 Gigantol suppressed the migratory behaviour through a Cav-1-dependent pathway. Gigantol suppressed EMT, resulting in a reduction of migration Moscatilin inhibited cell migration and invasion through attenuation of endogenous ROS The ability of invasion and migration was suppressed upon exposure to riccardin D, and MMP-2/9 levels were significantly decreased TDB reduced cell migration and invasion by decreasing migration-regulated proteins, including integrins αy, α4, β1. 	(29) (96) (97) (98) (39)
Bibenzyls	Gigantol Moscatilin Riccardin D TDB	H460, H292 H460, H292 H460 H23 A549 H292	(1, 5, 10 and 50 μ M) Wound-healing assay Transwell migration and invasion assays (5, 10 and 20 μ M) Wound-healing assay Transwell migration and invasion assays (1, 5, 10 and 20 μ M) Wound-healing assay Transwell migration and invasion assays (0.25, 0.5 and 1 μ M) Wound-healing assay Transwell invasion assay Gelatin Zymography (2.5, 5, 10 and 20 μ M) Wound-healing assay Transwell migration and invasion assays (0.25, 0.5 and 1 μ M)	 Chrysotobibenzyl inhibited cell migration via depletion of Cav-1, integrins β1, β3, and av and also suppressed EM1 Gigantol suppressed the migratory behaviour through a Cav-1-dependent pathway. Gigantol suppressed EMT, resulting in a reduction of migration Moscatilin inhibited cell migration and invasion through attenuation of endogenous ROS The ability of invasion and migration was suppressed upon exposure to riccardin D, and MMP-2/9 levels were significantly decreased TDB reduced cell migration and invasion by decreasing migration-regulated proteins, including integrins αν, α4, β1, β3, and β5, as well as downstream signalling proteins, such as pFAK, Rac1-GTP, and CDC42 	(29) (96) (97) (98) (39)
Bibenzyls Terpenes	Gigantol Moscatilin Riccardin D TDB Actein	H460, H292 H460, H292 H460 H23 A549 H292 A549, 95D	 Wound-healing assay Transwell migration and invasion assays (1, 5, 10 and 50 μM) Wound-healing assay Transwell migration and invasion assays (5, 10 and 20 μM) Wound-healing assay Transwell migration and invasion assays (1, 5, 10 and 20 μM) Wound-healing assay Transwell migration and invasion assays (0.25, 0.5 and 1 μM) Wound-healing assay Transwell invasion assay Gelatin Zymography (2.5, 5, 10 and 20 μM) Wound-healing assay Transwell migration and invasion assays (0.5, 1 and 5 μM) Wound-healing assay Transwell migration and invasion assays (0.5, 1 and 5 μM) Wound-healing assay Transwell migration and invasion assays (20 and 40 μM) 	 Chrysotobibenzyl inhibited cell migration via depletion of Cav-1, integrins p1, p3, and αv and also suppressed EW1 Gigantol suppressed the migratory behaviour through a Cav-1-dependent pathway. Gigantol suppressed EMT, resulting in a reduction of migration Moscatilin inhibited cell migration and invasion through attenuation of endogenous ROS The ability of invasion and migration was suppressed upon exposure to riccardin D, and MMP-2/9 levels were significantly decreased TDB reduced cell migration and invasion by decreasing migration-regulated proteins, including integrins αν, α4, β1, β3, and β5, as well as downstream signalling proteins, such as pFAK, Rac1-GTP, and CDC42 Actein suppressed cell migration and invasion 	(29) (96) (97) (98) (39) (99)
Bibenzyls Terpenes	Chrysotobibenzyi Gigantol Moscatilin Riccardin D TDB Actein Alisol B	H460, H292 H460, H292 H460 H23 A549 H292 A549, 95D	 Wound-healing assay transwell migration and invasion assays (1, 5, 10 and 50 μM) Wound-healing assay Transwell migration and invasion assays (5, 10 and 20 μM) Wound-healing assay Transwell migration and invasion assays (1, 5, 10 and 20 μM) Wound-healing assay Transwell migration and invasion assays (0.25, 0.5 and 1 μM) Wound-healing assay Transwell invasion assay Gelatin Zymography (2.5, 5, 10 and 20 μM) Wound-healing assay Transwell migration and invasion assays (0.5, 1 and 5 μM) Wound-healing assay Transwell migration and invasion assays (20 and 40 μM) Wound-healing assay Transwell migration assay (6 and 9 mM) 	 Chrysotobibenzyl inhibited cell migration via depletion of Cav-1, integrins p1, p3, and αv and also suppressed EMT Gigantol suppressed the migratory behaviour through a Cav-1-dependent pathway. Gigantol suppressed EMT, resulting in a reduction of migration Moscatilin inhibited cell migration and invasion through attenuation of endogenous ROS The ability of invasion and migration was suppressed upon exposure to riccardin D, and MMP-2/9 levels were significantly decreased TDB reduced cell migration and invasion by decreasing migration-regulated proteins, including integrins αν, α4, β1, β3, and β5, as well as downstream signalling proteins, such as pFAK, Rac1-GTP, and CDC42 Actein suppressed cell migration and invasion through the inhibition of the PI3K/AKT/mTOR pathway 	(29) (96) (97) (98) (39) (99) (101)
Bibenzyls Terpenes	Chrysotobibenzyi Gigantol Moscatilin Riccardin D TDB Actein Alisol B Betulin	H460, H292 H460, H292 H460 H23 A549 H292 A549, 95D A549	 Wound-healing assay Transwell migration and invasion assays (1, 5, 10 and 50 μM) Wound-healing assay Transwell migration and invasion assays (5, 10 and 20 μM) Wound-healing assay Transwell migration and invasion assays (1, 5, 10 and 20 μM) Wound-healing assay Transwell migration and invasion assays (0.25, 0.5 and 1 μM) Wound-healing assay Transwell invasion assay Gelatin Zymography (2.5, 5, 10 and 20 μM) Wound-healing assay Transwell migration and invasion assays (0.5, 1 and 20 μM) Wound-healing assay Transwell migration and invasion assays (0.5, 1 and 5 μM) Wound-healing assay Transwell migration and invasion assays (20 and 40 μM) Wound-healing assay Transwell invasion assay (6 and 9 mM) Wound-healing assay Transwell invasion assay (6 and 9 mM) 	 Chrysotobibenzyl inhibited cell migration via depletion of Cav-1, integrins β1, β3, and av and also suppressed EM1 Gigantol suppressed the migratory behaviour through a Cav-1-dependent pathway. Gigantol suppressed EMT, resulting in a reduction of migration Moscatilin inhibited cell migration and invasion through attenuation of endogenous ROS The ability of invasion and migration was suppressed upon exposure to riccardin D, and MMP-2/9 levels were significantly decreased TDB reduced cell migration and invasion by decreasing migration-regulated proteins, including integrins αν, α4, β1, β3, and β5, as well as downstream signalling proteins, such as pFAK, Rac1-GTP, and CDC42 Actein suppressed cell migration and invasion through the inhibition of the PI3K/AKT/mTOR pathway Betulin suppressed migration and invasion by inhibiting MMP-2/9 	(29) (96) (97) (98) (39) (99) (101) (102)
Bibenzyls Terpenes	Chrysotobibenzyi Gigantol Moscatilin Riccardin D TDB Actein Alisol B Betulin	H460, H292 H460, H292 H460 H23 A549 H292 A549, 95D A549 H460	 Wound-healing assay Transwell migration and invasion assays (1, 5, 10 and 50 μM) Wound-healing assay Transwell migration and invasion assays (5, 10 and 20 μM) Wound-healing assay Transwell migration and invasion assays (1, 5, 10 and 20 μM) Wound-healing assay Transwell migration and invasion assays (0.25, 0.5 and 1 μM) Wound-healing assay Transwell invasion assay Gelatin Zymography (2.5, 5, 10 and 20 μM) Wound-healing assay Transwell migration and invasion assays (0.5, 1 and 5 μM) Wound-healing assay Transwell migration and invasion assays (20 and 40 μM) Wound-healing assay Transwell migration assay (6 and 9 mM) Wound-healing assay Transwell invasion assay (6 and 9 mM) Wound-healing assay Transwell invasion assay Gelatin zymography (11 and 30 μM) 	 Chrysotobibenzyl inhibited cell migration via depletion of Cav-1, integrins β1, p3, and av and also suppressed EM1 Gigantol suppressed the migratory behaviour through a Cav-1-dependent pathway. Gigantol suppressed EMT, resulting in a reduction of migration Moscatilin inhibited cell migration and invasion through attenuation of endogenous ROS The ability of invasion and migration was suppressed upon exposure to riccardin D, and MMP-2/9 levels were significantly decreased TDB reduced cell migration and invasion by decreasing migration-regulated proteins, including integrins αν, α4, β1, β3, and β5, as well as downstream signalling proteins, such as pFAK, Rac1-GTP, and CDC42 Actein suppressed cell migration and invasion through the inhibition of the PI3K/AKT/mTOR pathway Betulin suppressed migration and invasion by inhibiting MMP-2/9 	 (29) (96) (97) (98) (39) (99) (101) (102)
Bibenzyls Terpenes	Chrysotobibenzyi Gigantol Moscatilin Riccardin D TDB Actein Alisol B Betulin Frondoside A	H460, H292 H460, H292 H460 H23 A549 H292 A549, 95D A549 H460 LNM35	 Wound-healing assay Transwell migration and invasion assays (1, 5, 10 and 50 μM) Wound-healing assay Transwell migration and invasion assays (5, 10 and 20 μM) Wound-healing assay Transwell migration and invasion assays (1, 5, 10 and 20 μM) Wound-healing assay Transwell migration and invasion assays (0.25, 0.5 and 1 μM) Wound-healing assay Transwell migration assay Gelatin Zymography (2.5, 5, 10 and 20 μM) Wound-healing assay Transwell migration and invasion assays (0.5, 1 and 5 μM) Wound-healing assay Transwell migration and invasion assays (2.5, 1 and 5 μM) Wound-healing assay Transwell migration and invasion assays (2.6, 1 and 5 μM) Wound-healing assay Transwell migration and invasion assays (1, 1 and 3 μM) Wound-healing assay Transwell invasion assay (6 and 9 mM) Wound-healing assay Transwell invasion assay Gelatin zymography (11 and 30 μM) Wound-healing assay Transwell invasion assay (0.1 and 0.5 μM) 	Chrysotobiberzyl innibited cell migration via depletion of Cav-1, integrins p1, p3, and av and also suppressed EW1 Gigantol suppressed the migratory behaviour through a Cav-1-dependent pathway. Gigantol suppressed EMT, resulting in a reduction of migration Moscatilin inhibited cell migration and invasion through attenuation of endogenous ROS The ability of invasion and migration was suppressed upon exposure to riccardin D, and MMP-2/9 levels were significantly decreased TDB reduced cell migration and invasion by decreasing migration-regulated proteins, including integrins αν, α4, β1, β3, and β5, as well as downstream signalling proteins, such as pFAK, Rac1-GTP, and CDC42 Actein suppressed cell migration and invasion through the inhibition of the PI3K/AKT/mTOR pathway Betulin suppressed cell migration and invasion by inhibiting MMP-2/9 Frondoside A inhibited cell migration, invasion and angiogenesis	 (29) (96) (97) (98) (39) (99) (101) (102) (100)
Bibenzyls Terpenes	Chrysotobibenzyi Gigantol Moscatilin Riccardin D TDB Actein Alisol B Betulin Frondoside A Nagilactone E	H460, H292 H460, H292 H460 H23 A549 H292 A549, 95D A549 H460 LNM35	 Wound-healing assay transwell migration and invasion assays (1, 5, 10 and 50 μM) Wound-healing assay Transwell migration and invasion assays (5, 10 and 20 μM) Wound-healing assay Transwell migration and invasion assays (1, 5, 10 and 20 μM) Wound-healing assay Transwell migration and invasion assays (0.25, 0.5 and 1 μM) Wound-healing assay Transwell invasion assay Gelatin Zymography (2.5, 5, 10 and 20 μM) Wound-healing assay Transwell migration and invasion assays (0.5, 1 and 20 μM) Wound-healing assay Transwell migration and invasion assays (2.5, 5, 10 and 20 μM) Wound-healing assay Transwell migration and invasion assays (2.5, 1 and 5 μM) Wound-healing assay Transwell migration and invasion assays (20 and 40 μM) Wound-healing assay Transwell invasion assay (6 and 9 mM) Wound-healing assay Transwell invasion assay Gelatin zymography (11 and 30 μM) Wound-healing assay Transwell invasion assay (0.1 and 0.5 μM) Transwell migration and invasion assays (2 and 4 μM) 	Chrysotobiberzyi inhibited cell migration via depletion of Cav-1, integrins β1, β3, and av and also suppressed EM1 Gigantol suppressed the migratory behaviour through a Cav-1-dependent pathway. Gigantol suppressed EMT, resulting in a reduction of migration Moscatilin inhibited cell migration and invasion through attenuation of endogenous ROS The ability of invasion and migration was suppressed upon exposure to riccardin D, and MMP-2/9 levels were significantly decreased TDB reduced cell migration and invasion by decreasing migration-regulated proteins, including integrins αν, α4, β1, β3, and β5, as well as downstream signalling proteins, such as pFAK, Rac1-GTP, and CDC42 Actein suppressed cell migration and invasion Alisol B suppressed cell migration and invasion through the inhibition of the PI3K/AKT/mTOR pathway Betulin suppressed migration and invasion by inhibiting MMP-2/9 Frondoside A inhibited cell migration, invasion and angiogenesis NLE inhibited TGF-β1-stimulated cell migration and invasion by suppressing Smad2 and Smad3, thus suppressing EMT	(29) (96) (97) (98) (39) (39) (101) (102) (102) (100) (103)
Bibenzyls Terpenes	Chrysotobibenzyi Gigantol Moscatilin Riccardin D TDB Actein Alisol B Betulin Frondoside A Nagilactone E	H460, H292 H460, H292 H460 H23 A549 H292 A549, 95D A549 H460 LNM35 A549	 Wound-healing assay transwell migration and invasion assays (1, 5, 10 and 50 μM) Wound-healing assay Transwell migration and invasion assays (5, 10 and 20 μM) Wound-healing assay Transwell migration and invasion assays (1, 5, 10 and 20 μM) Wound-healing assay Transwell migration and invasion assays (0.25, 0.5 and 1 μM) Wound-healing assay Transwell migration assay Gelatin Zymography (2.5, 5, 10 and 20 μM) Wound-healing assay Transwell migration and invasion assays (0.25, 0.5 and 1 μM) Wound-healing assay Transwell migration and invasion assays (0.5, 1 and 5 μM) Wound-healing assay Transwell migration and invasion assays (20 and 40 μM) Wound-healing assay Transwell invasion assay (6 and 9 mM) Wound-healing assay Transwell invasion assay Gelatin zymography (11 and 30 μM) Wound-healing assay Transwell invasion assay (0.1 and 0.5 μM) Transwell migration and invasion assays (2 and 4 μM) 	 Chrysotobidenzyi inhibited cell migration via depletion of Cav-1, integrins β1, p3, and av and also suppressed EMT Gigantol suppressed the migratory behaviour through a Cav-1-dependent pathway. Gigantol suppressed EMT, resulting in a reduction of migration Moscatilin inhibited cell migration and invasion through attenuation of endogenous ROS The ability of invasion and migration was suppressed upon exposure to riccardin D, and MMP-2/9 levels were significantly decreased TDB reduced cell migration and invasion by decreasing migration-regulated proteins, including integrins αν, α4, β1, β3, and β5, as well as downstream signalling proteins, such as pFAK, Rac1-GTP, and CDC42 Actein suppressed cell migration and invasion through the inhibition of the PI3K/AKT/mTOR pathway Betulin suppressed migration and invasion by inhibiting MMP-2/9 Frondoside A inhibited cell migration, invasion and angiogenesis NLE inhibited TGF-β1-stimulated cell migration and invasion by suppressing Smad2 and Smad3, thus suppressing EMT 	 (27) (29) (96) (97) (98) (39) (99) (101) (102) (100) (103)
Bibenzyls	Chrysotobibenzyi Gigantol Moscatilin Riccardin D TDB Actein Alisol B Betulin Frondoside A Nagilactone E Triptolide	H460, H292 H460, H292 H460 H23 A549 H292 A549, 95D A549 H460 LNM35 A549	 (1, 5, 10 and 50 μM) Wound-healing assay Transwell migration and invasion assays (5, 10 and 20 μM) Wound-healing assay Transwell migration and invasion assays (1, 5, 10 and 20 μM) Wound-healing assay Transwell migration and invasion assays (0.25, 0.5 and 1 μM) Wound-healing assay Transwell migration assay Gelatin Zymography (2.5, 5, 10 and 20 μM) Wound-healing assay Transwell migration and invasion assays (0.25, 0.5 and 1 μM) Wound-healing assay Transwell migration and invasion assays (0.5, 1 and 20 μM) Wound-healing assay Transwell migration and invasion assays (2.5, 5, 10 and 20 μM) Wound-healing assay Transwell migration and invasion assays (2.5, 1 and 5 μM) Wound-healing assay Transwell migration and invasion assays (20 and 40 μM) Wound-healing assay Transwell invasion assay (6 and 9 mM) Wound-healing assay Transwell invasion assay Gelatin zymography (11 and 30 μM) Wound-healing assay Transwell invasion assay (0.1 and 0.5 μM) Transwell migration and invasion assays (2 and 4 μM) Transwell migration and invasion assays (10 nM) 	Chrysotoblenzyl inhibited cell migration via depletion of CaV-1, integrins p1, p3, and av and also suppressed EMT Gigantol suppressed the migratory behaviour through a Cav-1-dependent pathway. Gigantol suppressed EMT, resulting in a reduction of migration Moscatilin inhibited cell migration and invasion through attenuation of endogenous ROS The ability of invasion and migration was suppressed upon exposure to riccardin D, and MMP-2/9 levels were significantly decreased TDB reduced cell migration and invasion by decreasing migration-regulated proteins, including integrins αν, α4, β1, β3, and β5, as well as downstream signalling proteins, such as pFAK, Rac1-GTP, and CDC42 Actein suppressed cell migration and invasion Alisol B suppressed cell migration and invasion through the inhibition of the PI3K/AKT/mTOR pathway Betulin suppressed migration and invasion by inhibiting MMP-2/9 Frondoside A inhibited cell migration, invasion and angiogenesis NLE inhibited TGF-β1-stimulated cell migration and invasion by suppressing Smad2 and Smad3, thus suppressing EMT	 (27) (29) (96) (97) (98) (39) (99) (101) (102) (100) (103) (36)
Bibenzyls	Chrysotobibenzyi Gigantol Moscatilin Riccardin D TDB Actein Alisol B Betulin Frondoside A Nagilactone E Triptolide Ursolic acid	H460, H292 H460 H23 A549 A549 A549, 95D A549 H460 LNM35 A549 A549 A549	 Wound-healing assay framework migration and invasion assays (1, 5, 10 and 50 μM) Wound-healing assay Transwell migration and invasion assays (5, 10 and 20 μM) Wound-healing assay Transwell migration and invasion assays (1, 5, 10 and 20 μM) Wound-healing assay Transwell migration and invasion assays (0.25, 0.5 and 1 μM) Wound-healing assay Transwell migration and invasion assays (0.25, 0.5 and 1 μM) Wound-healing assay Transwell migration and invasion assays (0.5, 1 and 20 μM) Wound-healing assay Transwell migration and invasion assays (0.5, 1 and 5 μM) Wound-healing assay Transwell migration and invasion assays (20 and 40 μM) Wound-healing assay Transwell migration and invasion assays (20 and 40 μM) Wound-healing assay Transwell invasion assay (6 and 9 mM) Wound-healing assay Transwell invasion assay Gelatin zymography (11 and 30 μM) Wound-healing assay Transwell invasion assay (0.1 and 0.5 μM) Transwell migration and invasion assays (2 and 4 μM) Transwell migration and invasion assays (10 nM) Wound-healing assay (25 μM) 	Chrystobblenzy inhibited cell migration via depletion of Cav-1, integrins p1, p3, and av and also suppressed EM1 Gigantol suppressed the migratory behaviour through a Cav-1-dependent pathway. Gigantol suppressed EMT, resulting in a reduction of migration Moscatilin inhibited cell migration and invasion through attenuation of endogenous ROS The ability of invasion and migration was suppressed upon exposure to riccardin D, and MMP-2/9 levels were significantly decreased TDB reduced cell migration and invasion by decreasing migration-regulated proteins, including integrins αν, α4, β1, β3, and β5, as well as downstream signalling proteins, such as pFAK, Rac1-GTP, and CDC42 Actein suppressed cell migration and invasion Alisol B suppressed cell migration and invasion through the inhibition of the Pl3K/AKT/mTOR pathway Betulin suppressed migration and invasion by inhibiting MMP-2/9 Frondoside A inhibited cell migration, invasion and angiogenesis NLE inhibited TGF-β1-stimulated cell migration and invasion by suppressing Smad2 and Smad3, thus suppressing EMT	(29) (96) (97) (98) (39) (101) (102) (100) (100) (103) (36) (104)
Bibenzyls Terpenes	Chrysotobbenzyi Gigantol Moscatilin Riccardin D TDB Actein Alisol B Betulin Frondoside A Nagilactone E Triptolide Ursolic acid	H460, H292 H460, H292 H460 H23 A549 A549 H292 A549, 95D A549 H460 LNM35 A549 A549 A549 H1975 A549	 Wound-healing assay Transwell migration and invasion assays (1, 5, 10 and 50 μM) Wound-healing assay Transwell migration and invasion assays (5, 10 and 20 μM) Wound-healing assay Transwell migration and invasion assays (1, 5, 10 and 20 μM) Wound-healing assay Transwell migration and invasion assays (0.25, 0.5 and 1 μM) Wound-healing assay Transwell migration and invasion assays (2.5, 5, 10 and 20 μM) Wound-healing assay Transwell migration and invasion assays (0.25, 0.5 and 1 μM) Wound-healing assay Transwell migration and invasion assays (0.5, 1 and 50 μM) Wound-healing assay Transwell migration and invasion assays (20 and 40 μM) Wound-healing assay Transwell invasion assay (6 and 9 mM) Wound-healing assay Transwell invasion assay (6 and 9 mM) Wound-healing assay Transwell invasion assay (0.1 and 0.5 μM) Transwell migration and invasion assays (2 and 4 μM) Transwell migration and invasion assays (10 nM) Wound-healing assay (25 μM) Wound-healing assay Transwell invasion assays (5, 10 and 20 μM) 	Chrysotobidenzyl innibited cell migration via depletion of Cav-1, Integrins p1, p3, and αv and also suppressed EM1 Gigantol suppressed the migratory behaviour through a Cav-1-dependent pathway. Gigantol suppressed EMT, resulting in a reduction of migration Moscatilin inhibited cell migration and invasion through attenuation of endogenous ROS The ability of invasion and migration was suppressed upon exposure to riccardin D, and MMP-2/9 levels were significantly decreased TDB reduced cell migration and invasion by decreasing migration-regulated proteins, including integrins αν, α4, β1, β3, and β5, as well as downstream signalling proteins, such as pFAK, Rac1-GTP, and CDC42 Actein suppressed cell migration and invasion Alisol B suppressed cell migration and invasion through the inhibition of the PI3K/AKT/mTOR pathway Betulin suppressed cell migration, invasion and angiogenesis NLE inhibited TGF-β1-stimulated cell migration and invasion by suppressing Smad2 and Smad3, thus suppressing EMT Triptolide altered the expression of microRNAs involved in cellular movement and decreased migration and invasion by reducing FAK expression which impaired its downstream signalling Ursolic acid induced apoptosis, and inhibited cell migration and proliferation by negatively regulating the β-catenin/ TCF4/CT45A2 signalling pathway Datrinoline inhibited the proliferation, migration, invasion, and EMT phenotype of chemo-resistant cells by reversing	 (27) (29) (96) (97) (98) (39) (99) (101) (102) (100) (103) (36) (104) (105)
Bibenzyls Terpenes	Chrysotobibenzyi Gigantol Moscatilin Riccardin D TDB Actein Alisol B Betulin Frondoside A Nagilactone E Triptolide Ursolic acid Daurinoline	H460, H292 H460, H292 H460 H23 A549 H292 A549, 95D A549 H460 LNM35 A549 A549, H460, H358 H1975 A549	 (1, 5, 10 and 50 μM) Wound-healing assay Transwell migration and invasion assays (5, 10 and 20 μM) Wound-healing assay Transwell migration and invasion assays (1, 5, 10 and 20 μM) Wound-healing assay Transwell migration and invasion assays (0.25, 0.5 and 1 μM) Wound-healing assay Transwell migration and invasion assays (0.25, 0.5 and 1 μM) Wound-healing assay Transwell migration and invasion assays (0.25, 5, 10 and 20 μM) Wound-healing assay Transwell migration and invasion assays (0.5, 1 and 5 μM) Wound-healing assay Transwell migration and invasion assays (0.5, 1 and 5 μM) Wound-healing assay Transwell migration and invasion assays (20 and 40 μM) Wound-healing assay Transwell invasion assay (6 and 9 mM) Wound-healing assay Transwell invasion assay Gelatin zymography (11 and 30 μM) Wound-healing assay Transwell invasion assay (0.1 and 0.5 μM) Transwell migration and invasion assays (2 and 4 μM) Transwell migration and invasion assays (10 nM) Wound-healing assay (25 μM) Wound-healing assay (25 μM) Wound-healing assay Transwell invasion assays (5, 10 and 20 μM) 	Chrysotobidenzyl innibited cell migration via depletion of Cav-1, integrins p1, p3, and αv and also suppressed EM1 Gigantol suppressed the migratory behaviour through a Cav-1-dependent pathway. Gigantol suppressed EMT, resulting in a reduction of migration Moscatilin inhibited cell migration and invasion through attenuation of endogenous ROS The ability of invasion and migration was suppressed upon exposure to riccardin D, and MMP-2/9 levels were significantly decreased TDB reduced cell migration and invasion by decreasing migration-regulated proteins, including integrins αν, α4, β1, β3, and β5, as well as downstream signalling proteins, such as pFAK, Rac1-GTP, and CDC42 Actein suppressed cell migration and invasion Alisol B suppressed cell migration and invasion through the inhibition of the PI3K/AKT/mTOR pathway Betulin suppressed migration and invasion by inhibiting MMP-2/9 Frondoside A inhibited cell migration, invasion and angiogenesis NLE inhibited TGF-β1-stimulated cell migration and invasion by suppressing Smad2 and Smad3, thus suppressing EMT Triptolide altered the expression of microRNAs involved in cellular movement and decreased migration and invasion by reducing FAK expression which impaired its downstream signalling Ursolic acid induced apoptosis, and inhibited cell migration, and proliferation by negatively regulating the β-catenin/ TCF4/CT45A2 signalling pathway Daurinoline inhibited the proliferation, migration, invasion, and EMT phenotype of chemo-resistant cells by reversing EMT and Noth-1	 (27) (29) (96) (97) (98) (39) (99) (101) (102) (100) (100) (103) (36) (104) (105)
Bibenzyls Terpenes Alkaloids	Chrysotobibenzyi Gigantol Moscatilin Riccardin D TDB Actein Alisol B Betulin Frondoside A Nagilactone E Triptolide Ursolic acid Daurinoline Krukovine	H460, H292 H460, H292 H460 H23 A549 H292 A549, 95D A549 H460 LNM35 A549 A549 H460, H358 H1975 A549 H354 H1975	 (1, 5, 10 and 50 μM) Wound-healing assay Transwell migration and invasion assays (5, 10 and 20 μM) Wound-healing assay Transwell migration and invasion assays (1, 5, 10 and 20 μM) Wound-healing assay Transwell migration and invasion assays (0.25, 0.5 and 1 μM) Wound-healing assay Transwell migration and invasion assays (0.25, 0.5 and 1 μM) Wound-healing assay Transwell migration and invasion assays (0.5, 1 and 20 μM) Wound-healing assay Transwell migration and invasion assays (0.5, 1 and 20 μM) Wound-healing assay Transwell migration and invasion assays (0.5, 1 and 5 μM) Wound-healing assay Transwell migration and invasion assays (20 and 40 μM) Wound-healing assay Transwell migration and invasion assays (20 and 40 μM) Wound-healing assay Transwell invasion assay (6 and 9 mM) Wound-healing assay Transwell invasion assay Gelatin zymography (11 and 30 μM) Wound-healing assay Transwell invasion assay (0.1 and 0.5 μM) Transwell migration and invasion assays (2 and 4 μM) Transwell migration and invasion assays (10 nM) Wound-healing assay (25 μM) Wound-healing assay Transwell invasion assay (5, 10 and 20 μM) Wound-healing assay Transwell invasion assays (5, 10 and 20 μM) 	Chrysotoblenzyl inhibited cell migration via depletion of Cav-1, integrins p1, p3, and w and also suppressed EMT Gigantol suppressed the migratory behaviour through a Cav-1-dependent pathway. Gigantol suppressed EMT, resulting in a reduction of migration Moscatilin inhibited cell migration and invasion through attenuation of endogenous ROS The ability of invasion and migration was suppressed upon exposure to riccardin D, and MMP-2/9 levels were significantly decreased TDB reduced cell migration and invasion by decreasing migration-regulated proteins, including integrins αν, e4, β1, β3, and β5, as well as downstream signalling proteins, such as pFAK, Rac1-GTP, and CDC42 Actein suppressed cell migration and invasion through the inhibition of the PI3K/AKT/mTOR pathway Betulin suppressed cell migration and invasion through the inhibition of the PI3K/AKT/mTOR pathway Betulin suppressed migration and invasion by inhibiting MMP-2/9 Frondoside A inhibited cell migration, invasion and angiogenesis NLE inhibited TGF-β1-stimulated cell migration and invasion by suppressing Smad2 and Smad3, thus suppressing EMT Triptolide altered the expression of microRNAs involved in cellular movement and decreased migration and invasion by reducing FAK expression which impaired its downstream signalling Ursolic acid induced apoptosis, and inhibited cell migration and proliferation by negatively regulating the β-catenin/ TCF4/CT45A2 signalling pathway Daurinoline inhibited the proliferation, migration, invasion, and EMT phenotype of chemo-resistant cells by reversing EMT and Notch-1	 (27) (29) (96) (97) (98) (39) (99) (101) (102) (100) (100) (103) (36) (104) (105) (106)
Bibenzyls Terpenes	Chrysotobibenzyi Gigantol Moscatilin Riccardin D TDB Actein Alisol B Betulin Frondoside A Betulin Frondoside A Nagilactone E Triptolide Ursolic acid Daurinoline Krukovine	H460, H292 H460, H292 H460 H23 A549 H292 A549, 95D A549 H460 LNM35 A549 A549 A549 A549, H460, H358 H1975 A549 A549, H460	 Yound-healing assay Transwell migration and invasion assays (1, 5, 10 and 20 μM) Wound-healing assay Transwell migration and invasion assays (5, 10 and 20 μM) Wound-healing assay Transwell migration and invasion assays (1, 5, 10 and 20 μM) Wound-healing assay Transwell migration and invasion assays (0.25, 0.5 and 1 μM) Wound-healing assay Transwell migration and invasion assays (0.25, 5, 10 and 20 μM) Wound-healing assay Transwell migration and invasion assays (0.5, 1 and 5 μM) Wound-healing assay Transwell migration and invasion assays (20 and 40 μM) Wound-healing assay Transwell migration assay (6 and 9 mM) Wound-healing assay Transwell invasion assay (6 and 9 mM) Wound-healing assay Transwell invasion assay (0.1 and 0.5 μM) Transwell migration and invasion assays (2 and 4 μM) Transwell migration and invasion assays (10 nM) Wound-healing assay (25 μM) Wound-healing assay Transwell invasion assays (5, 10 and 20 μM) Wound-healing assay (5, 7.5, 10 and 20 μM) Transwell migration and invasion assays (10 nM) Transwell migration and invasion assays (11 m/mL) 	Chrysotoblenzyi inhibited cell migration via depletion of CaV-1, Integrins p1, p3, and av and also suppressed EMT Gigantol suppressed the migratory behaviour through a CaV-1-dependent pathway. Gigantol suppressed EMT, resulting in a reduction of migration Moscatilin inhibited cell migration and invasion through attenuation of endogenous ROS The ability of invasion and migration was suppressed upon exposure to riccardin D, and MMP-2/9 levels were significantly decreased TDB reduced cell migration and invasion by decreasing migration-regulated proteins, including integrins αν, α4, β1, β3, and β5, as well as downstream signalling proteins, such as pFAK, Rac1-GTP, and CDC42 Actein suppressed cell migration and invasion Alisol B suppressed cell migration and invasion through the inhibition of the PI3K/AKT/mTOR pathway Betulin suppressed cell migration and invasion by inhibiting MMP-2/9 Frondoside A inhibited cell migration, invasion and angiogenesis NLE inhibited TGF-β1-stimulated cell migration and invasion by suppressing Smad2 and Smad3, thus suppressing EMT Triptolide altered the expression of microRNAs involved in cellular movement and decreased migration and invasion by reducing FAK expression which impaired its downstream signalling Ursolic acid induced apoptosis, and inhibited cell migration and proliferation by negatively regulating the β-catenin/ TCF4/CT45A2 signalling pathway Daurinoline inhibited the proliferation, migration, invasion, and EMT phenotype of chemo-resistant cells by reversing EMT and Notch-1 Krukovine suppressed migration by preventing the phosphorylation of ERK, AKT, PI3K, mTOR, C-RAF, and p70sk6k OMT inhibited cancer progression and metastasis by upregulation of miR-520 and downregulation of VEGF	 (27) (29) (96) (97) (98) (39) (99) (101) (102) (100) (103) (36) (104) (105) (106) (11)
Bibenzyls Terpenes Alkaloids	Chrysotobbenzyi Gigantol Moscatilin Riccardin D TDB Actein Alisol B Betulin Frondoside A Nagilactone E Triptolide Ursolic acid Daurinoline Krukovine	H460, H292 H460, H292 H460 H23 A549 H292 A549, 95D A549 H460 LNM35 A549 A549 A549 A549 A549, H460, H358 H1975 A549 A549, H460	 Yound-healing assay Transwell migration and invasion assays (1, 5, 10 and 50 μM) Wound-healing assay Transwell migration and invasion assays (5, 10 and 20 μM) Wound-healing assay Transwell migration and invasion assays (1, 5, 10 and 20 μM) Wound-healing assay Transwell migration and invasion assays (0.25, 0.5 and 1 μM) Wound-healing assay Transwell migration and invasion assays (0.5, 5, 10 and 20 μM) Wound-healing assay Transwell migration and invasion assays (0.5, 5, 10 and 20 μM) Wound-healing assay Transwell migration and invasion assays (0.5, 1 and 5 μM) Wound-healing assay Transwell migration and invasion assays (20 and 40 μM) Wound-healing assay Transwell migration and invasion assays (20 and 40 μM) Wound-healing assay Transwell invasion assay (6 and 9 mM) Wound-healing assay Transwell invasion assay (6 and 9 mM) Wound-healing assay Transwell invasion assay (0.1 and 0.5 μM) Transwell migration and invasion assays (2 and 4 μM) Transwell migration and invasion assays (10 nM) Wound-healing assay Transwell invasion assays (10 nM) Wound-healing assay Transwell invasion assays (5, 10 and 20 μM) Wound-healing assay (5, 7.5, 10 and 20 μM) Transwell migration and invasion assays (5, 10 and 20 μM) Transwell migration and invasion assays (1 mg/mL) Wound-healing assay (5, 7.5, 10 and 20 μM) 	Chrysotoblenzy inhibited cell migration via depletion of CaV-1, integrins p1, p3, and av and also suppressed EMT Gigantol suppressed the migratory behaviour through a CaV-1-dependent pathway. Gigantol suppressed EMT, resulting in a reduction of migration Moscatilin inhibited cell migration and invasion through attenuation of endogenous ROS The ability of invasion and migration was suppressed upon exposure to riccardin D, and MMP-2/9 levels were significantly decreased TDB reduced cell migration and invasion by decreasing migration-regulated proteins, including integrins αν, α4, β1, β3, and β5, as well as downstream signalling proteins, such as pFAK, Rac1-GTP, and CDC42 Actein suppressed cell migration and invasion Alisol B suppressed cell migration and invasion through the inhibition of the PI3K/AKT/mTOR pathway Betulin suppressed migration and invasion by inhibiting MMP-2/9 Frondoside A inhibited cell migration, invasion and angiogenesis NLE inhibited TGF-β1-stimulated cell migration and invasion by suppressing Smad2 and Smad3, thus suppressing EMT Triptolide altered the expression of microRNAs involved in cellular movement and decreased migration and invasion by reducing FAK expression which impaired its downstream signalling Ursolic acid induced apoptosis, and inhibited cell migration and proliferation by negatively regulating the β-catenin/ TCF4/CT45A2 signalling pathway Daurinoline inhibited the proliferation, migration, invasion, and EMT phenotype of chemo-resistant cells by reversing EMT and Notch-1 Krukovine suppressed migration by preventing the phosphorylation of ERK, AKT, PI3K, mTOR, C-RAF, and p70sk6k OMT inhibited cell migration	(27) (29) (96) (97) (98) (39) (101) (102) (100) (100) (103) (36) (104) (104) (105) (106) (106) (11) (107)
Bibenzyls Terpenes Alkaloids	Chrysotobibenzyi Gigantol Moscatilin Riccardin D TDB Actein Alisol B Betulin Frondoside A Betulin Frondoside A Nagilactone E Triptolide Ursolic acid Daurinoline Krukovine Oxymatrine	H460, H292 H460, H292 H460 H23 A549 H292 A549, 95D A549 H460 LNM35 A549 A549 A549 A549 A549 A549 H460 A549	 Yound-healing assay Transwell migration and invasion assays (1, 5, 10 and 50 μM) Wound-healing assay Transwell migration and invasion assays (5, 10 and 20 μM) Wound-healing assay Transwell migration and invasion assays (1, 5, 10 and 20 μM) Wound-healing assay Transwell migration and invasion assays (0.25, 0.5 and 1 μM) Wound-healing assay Transwell migration and invasion assays (0.5, 1 and 20 μM) Wound-healing assay Transwell migration and invasion assays (0.5, 5, 10 and 20 μM) Wound-healing assay Transwell migration and invasion assays (0.5, 1 and 5 μM) Wound-healing assay Transwell migration and invasion assays (20 and 40 μM) Wound-healing assay Transwell invasion assay (6 and 9 mM) Wound-healing assay Transwell invasion assay (6 and 9 mM) Wound-healing assay Transwell invasion assay (0.1 and 0.5 μM) Transwell migration and invasion assays (2 and 4 μM) Transwell migration and invasion assays (2 and 4 μM) Wound-healing assay Transwell invasion assay (5, 10 and 20 μM) Wound-healing assay (5, 7.5, 10 and 20 μM) 	Chrysonoobenzy innibited cell migration via depletion of CaV-1, integrine p1, p3, and aV and also suppressed EM1 Gigantol suppressed the migratory behaviour through a Cav-1-dependent pathway. Gigantol suppressed EMT, resulting in a reduction of migration Moscatilin inhibited cell migration and invasion through attenuation of endogenous ROS The ability of invasion and migration was suppressed upon exposure to riccardin D, and MMP-2/9 levels were significantly decreased TDB reduced cell migration and invasion by decreasing migration-regulated proteins, including integrins αν, α4, β1, β3, and β5, as well as downstream signalling proteins, such as pFAK, Rac1-GTP, and CDC42 Actein suppressed cell migration and invasion Alisol B suppressed cell migration and invasion through the inhibition of the PI3K/AKT/mTOR pathway Betulin suppressed relignation and invasion by inhibiting MMP-2/9 Frondoside A inhibited cell migration, invasion and angiogenesis NLE inhibited TGF-β1-stimulated cell migration and invasion by suppressing Smad2 and Smad3, thus suppressing EMT Triptolide altered the expression of microRNAs involved in cellular movement and decreased migration and invasion by reducing FAK expression which impaired its downstream signaling Ursolic acid induced apoptosis, and inhibited cell migration and proliferation by negatively regulating the β-catenin/ TCF4/CT45A2 signalling pathway Daurinoline inhibited the proliferation, migration, invasion, and EMT phenotype of chemo-resistant cells by reversing EMT and Notch-1 Krukovine suppressed migration by preventing the phosphorylation of ERK, AKT, PI3K, mTOR, C-RAF, and p70sk6k OMT inhibited cell migration	 (27) (29) (96) (97) (98) (39) (99) (101) (102) (100) (100) (103) (36) (104) (105) (106) (11) (107) (26)
Bibenzyls Terpenes Alkaloids Steroids	Chrysotobibenzyi Gigantol Moscatilin Riccardin D TDB Actein Alisol B Betulin Frondoside A Nagilactone E Triptolide Ursolic acid Daurinoline Krukovine Oxymatrine	H460, H292 H460, H292 H460 H23 A549 H292 A549, 95D A549 H460 LNM35 A549 A549, H460, H358 H1975 A549, H460 H354	 (1, 5, 10 and 50 μM) Wound-healing assay Transwell migration and invasion assays (5, 10 and 20 μM) Wound-healing assay Transwell migration and invasion assays (1, 5, 10 and 20 μM) Wound-healing assay Transwell migration and invasion assays (0, 25, 0.5 and 1 μM) Wound-healing assay Transwell migration and invasion assays (0, 25, 0.5 and 1 μM) Wound-healing assay Transwell migration and invasion assays (2, 5, 5, 10 and 20 μM) Wound-healing assay Transwell migration and invasion assays (0, 25, 0.5 and 1 μM) Wound-healing assay Transwell migration and invasion assays (0, 5, 1 and 5 μM) Wound-healing assay Transwell migration and invasion assays (20 and 40 μM) Wound-healing assay Transwell invasion assay (6 and 9 mM) Wound-healing assay Transwell invasion assay (6 and 9 mM) Wound-healing assay Transwell invasion assay (0.1 and 0.5 μM) Transwell migration and invasion assays (2 and 4 μM) Transwell migration and invasion assays (10 nM) Wound-healing assay Transwell invasion assay (5, 10 and 20 μM) Wound-healing assay (25 μM) Wound-healing assay (5, 7.5, 10 and 20 μM) Transwell migration and invasion assays (1 mg/mL) Wound-healing assay (1.5 and 2 mg/mL) Transwell migration and invasion assays (1 mg/mL) Wound-healing assay (1.5 and 2 mg/mL) Transwell migration and invasion assays Gelatin zymography (25, 50, 100 and 200 nM) 	Chrysonoolognay innobled cell migration via depletion of Cav-1, integrine p1, p3, and w and also suppressed EM1 Gigantol suppressed the migratory behaviour through a Cav-1-dependent pathway. Gigantol suppressed EMT, resulting in a reduction of migration Moscatilin inhibited cell migration and invasion through attenuation of endogenous ROS The ability of invasion and migration was suppressed upon exposure to riccardin D, and MMP-2/9 levels were significantly decreased TDB reduced cell migration and invasion by decreasing migration-regulated proteins, including integrins ev, e4, β1, [3, and [5, as well as downstream signalling proteins, such as pFAK, Rac1-GTP, and CDC42 Actein suppressed cell migration and invasion through the inhibition of the PI3K/AKT/mTOR pathway Betulin suppressed cell migration, invasion and angiogenesis NLE inhibited TGF-β1-stimulated cell migration and invasion by suppressing Smad2 and Smad3, thus suppressing EMT Triptolide altered the expression of microRNAs involved in cellular movement and decreased migration and invasion by reducing FAK expression of microRNAs involved in cellular movement and decreased migration and invasion by reducing FAK expression of microRNAs involved in cellular movement and decreased migration and invasion by reducing FAK expression of microRNAs involved in cellular movement and decreased migration and invasion by reducing FAK expression which impaired its downstream signalling Ursolic acid induced apoptosis, and inhibited cell migration and proliferation by negatively regulating the β-catenin/ TCF4/CTASA2 signaling pathway Daurinoline inhibited the proliferation, migration, invasion, and EMT phenotype of chemo-resistant cells by reversing EMT and Notch-1 Krukovine suppressed migration by preventing the phosphorylation of ERK, AKT, PI3K, mTOR, C-RAF, and p70skBk OMT inhibited cell migration Bufalin inhibited invasion and metastasis by upregulation of miR-520 and downregulation of VEGF OMT inhibited cell migration	 (27) (29) (96) (97) (98) (39) (99) (101) (102) (100) (100) (103) (36) (104) (105) (106) (11) (107) (26) (100)
Bibenzyls Terpenes Alkaloids Steroids	Chrysotobibenzyi Gigantol Moscatilin Riccardin D TDB Actein Alisol B Betulin Frondoside A Nagilactone E Triptolide Ursolic acid Daurinoline Krukovine Oxymatrine	H460, H292 H460, H292 H460 H23 A549 H292 A549, 95D A549 H460 LNM35 A549 A549 A549, H460, H358 H1975 A549, H460 H354 A549, H460	 (1, 5, 10 and 50 μM) Wound-healing assay Transwell migration and invasion assays (5, 10 and 20 μM) Wound-healing assay Transwell migration and invasion assays (1, 5, 10 and 20 μM) Wound-healing assay Transwell migration and invasion assays (0.25, 0.5 and 1 μM) Wound-healing assay Transwell migration and invasion assays (0.25, 0.5 and 1 μM) Wound-healing assay Transwell migration and invasion assays (0.5, 1 and 20 μM) Wound-healing assay Transwell migration and invasion assays (0.5, 1 and 5 μM) Wound-healing assay Transwell migration and invasion assays (20 and 40 μM) Wound-healing assay Transwell migration and invasion assays (20 and 40 μM) Wound-healing assay Transwell invasion assay (6 and 9 mM) Wound-healing assay Transwell invasion assay Gelatin zymography (11 and 30 μM) Wound-healing assay Transwell invasion assay (0.1 and 0.5 μM) Transwell migration and invasion assays (2 and 4 μM) Transwell migration and invasion assays (10 nM) Wound-healing assay Transwell invasion assays (10 nM) Wound-healing assay (25 μM) Wound-healing assay (25 μM) Wound-healing assay (5, 7.5, 10 and 20 μM) Transwell migration and invasion assays (1 mg/mL) Wound-healing assay (1.5 and 2 mg/mL) Transwell migration and invasion assays (1 mg/mL) Wound-healing assay (1.5 and 2 mg/mL) Transwell migration and invasion assays Gelatin zymography (25, 5, 0, 100 and 200 nM) Wound-healing assay Transwell migration and invasion assays (2, 5, 5, 0, 100 and 200 nM) Wound-healing assay Transwell migration and invasion assays (2, 5, 5, 0, 100 and 200 nM) Wound-healing assay Transwell migration and invasion assays (2, 5, 5, 0, 100 and 200 nM) 	Chrysolobiology innoted cell migration via depletion of CaV-1, integrins [1, 16], and dv and also suppressed EM1 Gigantol suppressed EMT, resulting in a reduction of migration Moscatilin inhibited cell migration and invasion through attenuation of endogenous ROS The ability of invasion and migration was suppressed upon exposure to riccardin D, and MMP-2/9 levels were significantly decreased TDB reduced cell migration and invasion by decreasing migration-regulated proteins, including integrins αν, α4, β1, β3, and β5, as well as downstream signalling proteins, such as pFAK, Rac1-GTP, and CDC42 Actein suppressed cell migration and invasion Allsol B suppressed cell migration and invasion through the inhibition of the PI3K/AKT/mTOR pathway Betulin suppressed cell migration, invasion and angiogenesis NLE inhibited Cell migration, invasion and angiogenesis NLE inhibited TGF-β1-stimulated cell migration, invasion and angiogenesis NLE inhibited TGF-β1-stimulated cell migration, invasion and angiogenesis CFG4/CTAS2 signalling approtession, which impaired its downstream signalling Ursolic acid induced apoptosis, and inhibited cell migration and proliferation by negatively regulating the β-caterin/ TCF4/CTAS2 signalling pathway Daurinoline inhibited the proliferation, migration, invasion, and EMT phenotype of chemo-resistant cells by reversing EMT and Notch-1 Krukovine suppressed migration by reventing the phosphorylation of ERK, AKT, PI3K, mTOR, C-RAF, and p70sk6k OMT inhibited cell migration Bufalin inhibited cell migration by suppressing NF-kB and MMP-2/9 Under sub-lethal concentrations, bufalin significantly inhibited cell adhesion, migration, and invasion of yeffinib- resistant H460 cells	 (27) (29) (96) (97) (98) (39) (99) (101) (102) (100) (100) (103) (36) (104) (105) (106) (104) (105) (106) (111) (107) (26) (109)
Bibenzyls Terpenes Alkaloids Steroids	Chrysotobibenzyi Gigantol Moscatilin Riccardin D TDB Actein Alisol B Betulin Frondoside A Nagilactone E Triptolide Ursolic acid Daurinoline Krukovine Oxymatrine	H460, H292 H460, H292 H460 H23 A549 H292 A549, 95D A549 H460 LNM35 A549 A549, H460, H358 H1975 A549, H460, H358 H1975 A549 H460	 (1, 5, 10 and 50 μM) Wound-healing assay Transwell migration and invasion assays (5, 10 and 20 μM) Wound-healing assay Transwell migration and invasion assays (1, 5, 10 and 20 μM) Wound-healing assay Transwell migration and invasion assays (0.25, 0.5 and 1 μM) Wound-healing assay Transwell migration and invasion assays (0.25, 10 and 20 μM) Wound-healing assay Transwell migration and invasion assays (0.25, 10 and 20 μM) Wound-healing assay Transwell invasion assay Gelatin Zymography (2.5, 5, 10 and 5 μM) Wound-healing assay Transwell migration and invasion assays (2.5, 1 and 5 μM) Wound-healing assay Transwell invasion assay (6 and 9 mM) Wound-healing assay Transwell invasion assay (6 and 9 mM) Wound-healing assay Transwell invasion assay (2 and 4 μM) Transwell migration and invasion assays (2 and 4 μM) Transwell migration and invasion assays (10 nM) Wound-healing assay Transwell invasion assay (5, 10 and 20 μM) Wound-healing assay (5, 7.5, 10 and 20 μM) Wound-healing assay (5, 7.5, 10 and 20 μM) Transwell migration and invasion assays (1 mg/mL) Wound-healing assay (1.5 and 2 mg/mL) Transwell migration and invasion assays Gelatin zymography (25, 5, 0, 100 and 200 nM) Wound-healing assay Transwell migration and invasion assays (2, 5 and 10 nM) Wound-healing assay Transwell migration and invasion assays (2, 5, and 10 nM) Wound-healing assay Transwell migration assay (50 nM) Wound-healing assay Transwell migration assay (50 nM) 	Chrysolobletzyl innioted cell migration via depletion of CaV-1, integrins [1, 15, and the and also suppressed EM1 Gigantol suppressed EMT, resulting in a reduction of migration Mescatilin inhibited cell migration and invasion through attenuation of endogenous ROS The ability of invasion and migration was suppressed upon exposure to riccardin D, and MMP-2/9 levels were significantly decreased TDB reduced cell migration and invasion by decreasing migration-regulated proteins, including integrins αν, α4, β1, [3], and [3], as well as downstream signalling proteins, such as pFAK, Rac1-GTP, and CDC42 Actein suppressed cell migration and invasion Alisol B suppressed cell migration and invasion through the inhibition of the PI3K/AKT/mTOR pathway Betulin suppressed cell migration, invasion and angiogenesis NLE inhibited TGF-β1-stimulated cell migration and invasion by suppressing Smad2 and Smad3, thus suppressing EMT Triptolice altered the expression of microRNAs involved in cellular movement and decreased migration and invasion by reducing FAK expression of microRNAs involved in cellular movement and decreased migration and invasion by reducing FAK expression which impaired its downstream signalling Ursolic acid induced apoptosis, and inhibited cell migration and proliferation by negatively regulating the β-catenin/ TCF4/CT4AS2 signalling pathway Daurinoline inhibited the proliferation, migration, invasion, and EMT phenotype of chemo-resistant cells by reversing EMT and Natch-1 Krukovine suppressed migration by preventing the phosphorylation of ERK, AKT, PI3K, mTOR, C-RAF, and p70sk6k OMT inhibited cancer progression and metastasis by upregulation of miR-520 and downregulation of VEGF OMT inhibited cancer progression and metastasis by upregulation of miR-520 and downregulation of VEGF OMT inhibited cancer progression and metastasis by upregulation of miR-520 and downregulation of VEGF OMT inhibited cell migration Bufalin inhibited cell migration by suppressing NF-kB and MMP-2/9 Under sub-letha	 (27) (29) (96) (97) (98) (39) (99) (101) (102) (100) (103) (36) (104) (105) (106) (111) (107) (26) (109) (108) (110)
Bibenzyls Terpenes Alkaloids Steroids	Chrysotobibenzyi Gigantol Moscatilin Riccardin D TDB Actein Actein Alisol B Betulin Frondoside A Nagilactone E Triptolide Ursolic acid Daurinoline Krukovine Cardenolides	H460, H292 H460, H292 H460 H23 A549 H292 A549, 95D A549 H460 LNM35 A549 A549 A549 A549, H460, H358 H1975 A549 A549 H160	 Wound-healing assay transwell migration and invasion assays (1, 5, 10 and 20 µM) Wound-healing assay Transwell migration and invasion assays (1, 5, 10 and 20 µM) Wound-healing assay Transwell migration and invasion assays (0, 26, 0, 5 and 1 µM) Wound-healing assay Transwell migration and invasion assays (0, 5, 10 and 20 µM) Wound-healing assay Transwell migration and invasion assays (0, 5, 10 and 20 µM) Wound-healing assay Transwell migration and invasion assays (0, 5, 1 and 5 µM) Wound-healing assay Transwell migration and invasion assays (0 and 40 µM) Wound-healing assay Transwell migration and invasion assays (20 and 40 µM) Wound-healing assay Transwell invasion assay (6 and 9 mM) Wound-healing assay Transwell invasion assay (0, 1 and 0, 5 µM) Transwell migration and invasion assays (2 and 4 µM) Transwell migration and invasion assays (10 nM) Wound-healing assay Transwell invasion assay (5, 10 and 20 µM) Wound-healing assay (25 µM) Wound-healing assay (5, 7, 5, 10 and 20 µM) Transwell migration and invasion assays (1 mg/mL) Wound-healing assay (1, 5 and 2 mg/mL) Transwell migration and invasion assays (1 mg/mL) Wound-healing assay (1, 5 and 2 mg/mL) Transwell migration and invasion assays Gelatin zymography (25, 50, 100 and 200 nM) Wound-healing assay Transwell migration and invasion assays (2, 5 and 10 nM) Wound-healing assay Transwell migration assay (50 nM) Wound-healing assay Transwell migration assay (50 nM) Wound-healing assay Transwell migration assay (10 and 50 nM) Wound-healing assay Transwell migration assay (50 nM) Wound-healing assay Transwell migration assay (10 and 50 nM) 	Chrysotobolerzy inhibited cell migration via depletion of CaV-1, megrins p1, p3, and evand also auppressed EMT Gigantol suppressed the migratory behaviour through a Cav-1-dependent pathway. Gigantol suppressed EMT, resulting in a reduction of migration Moscatilin inhibited cell migration and invasion through attenuation of endogenous ROS The ability of invasion and migration was suppressed upon exposure to riccardin D, and MMP-2/9 levels were significantly decreased TDB reduced cell migration and invasion by decreasing migration-regulated proteins, including integrins ov, e4, β1, β3, and β5, as well as downstream signalling proteins, such as pFAK, Rac1-GTP, and CDC42 Actein suppressed cell migration and invasion through the inhibition of the PI3K/AKT/mTOR pathway Betulin suppressed migration and invasion through the inhibition of the PI3K/AKT/mTOR pathway Betulin suppressed migration and invasion by inhibiting MMP-2/9 Frondoside A inhibited cell migration, invasion and angiogenesis NLE inhibited TGF-β1-stimulated cell migration and invasion by suppressing Smad2 and Smad3, thus suppressing EMT Triptolide altered the expression of microRNAs involved in cellular movement and decreased migration and invasion by reducing FAK expression which impaired its downstream signalling Ursolic acid induced apoptosis, and inhibited cell migration, and EMT phenotype of chemo-resistant cells by reversing EMT and Notch-1 Krukovine suppressed migration by suppressing NF-kB and MMP-2/9 Under sub-lefthal concentrations, bufalin significantly inhibited cell adhesion, migration, and invasion of VEGF OMT inhibited cell migration Bufalin inhibited invasion and migration by suppressing NF-kB and MMP-2/9 Under sub-lefthal concentrations, bufalin significantly inhibited cell adhesion, migration, and invasion of geffinitio- resistant H460 cells Bufalin suppressed TGF-P-induced EMT and migration by downregulating TBRI and TJRII DCX and CON demonstrated anti-proliferative activity and decreased migration and invasion	 (27) (29) (96) (97) (98) (39) (99) (101) (102) (100) (103) (36) (104) (105) (104) (105) (104) (105) (106) (111) (107) (26) (109) (108) (110) (111)
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Sodium new houttuyfonate	A549, H1299	Wound-healing assays Transwell invasion assays (0.1, 0.2 and 0.4 mM)	SNH decreased cell metastasis and invasion by suppressing EMT progression	(126)
Δ^9 -Tetrahydrocannabinol	A549, SW-1573	Wound-healing assay Transwell migration and invasion assays (5, 10 and 15 $\mu\text{M})$	THC treatment inhibits EGF-induced cell motility and invasion	(127)
Thymoquinone	A549	Wound-healing assay Transwell invasion assay Gelatin zymography (10, 20 and 40 $\mu\text{M})$	TQ suppressed the proliferation, migration, and invasion by inhibiting PCNA, cyclin D1, MMP-2/9	(45)

a⁷-nAChRs, alpha-7 nicotinic receptor; AFK, atalantraflavone; Akt, protein kinase B; AP-1, activation protein 1; BIO-A, Biochanin A; Cav-1, Caveolin 1; CCNG2, Cyclin-G2; CD, Cordycepin; CDC42, cell division control protein 42; c-FLIP, Cellular Fas-associated death domain-like IL-1 beta-converting enzyme inhibitory protein; CON, convallatoxin; COX-2, cyclooxygenase-2; C-RAF, RAF proto-oncogene serine/threonine-protein kinase; CT45A2, cancer/testis antigen family 45 member A2; CtsZ, Cathepsin Z; CXCR-4, C-X-C chemokine receptor type 4; DGX, digitoxigenin monodigitoxoside; ECG, Epicatechin-3-gallate; EGGG, Epigallocatechin-3-gallate; EGFR, epidermal growth factor receptor; EMT, epithelial-to-mesenchymal transition; EphA2, Ephrin type-A receptor 2; ERK 1/2, extracellular signal-regulated kinases 1 and 2; FAK, fo-a cladhesion kinase; FIS, fisetin; GSK-6, Bycogene synthase kinase 3 beta; GTN, Goniothalamin; HYSA, Hydroxysafflor yellow A; Id1, inhibitor of differentiation 1; JAK2, Janus kinase 2; MAPK, mitogen-activated protein kinase; MLMA, Methylene chloride extracts of Morus alba; MHMM-41, (3E,5E)-s-((1H-indol-3-y)]methyleos-(3-hydroxy-4-methoxybenzylidene)-1-methylpieridin-4-one (MHMM-41); MKX/6, Mitogen-activated protein kinase; MLK3, Mitogen-activated protein kinase; MLK3, Mitogen-activated protein kinase; MLK3, Mitogen-activated protein kinase; MLK3, Mitogen-activated protein kinase; PGP, Pa, Ophiopogonin B; P3G, Pelargonidin-3-O-glucoside; PAI, plasminogen activator inhibitor; PAK1, Serine/threonine-protein kinase; PCNA, Proliferating cell nuclear antigen; PDGF-BB, Platelet-derived growth factor; PEITC, Phenethyl isothiocyanate; PER1, period circadian protein homolog 1 protein; pFAK, focal adhesion kinase; PGE2, prostaglandin E2; PI3K, Phosphoinositide 3-kinase; PKC, protein kinase C; Rac1, Ras-related C3 botulinum toxin substrate 1; Rap1, Repressor Activator Protein 1; RhoA, Ras homolog family member A; ROCK1, Rho Associated Coiled-Coil Containing Protein Kinase 1; ROS, reactive oxygen species; RSK2, rib