

Oligo GEMicroarray[®] DNA Microarray:

Human Atherosclerosis

Catalog Number

OHS-038
EHS-038

Format:

HybTube (Standard protocol)
HybPlate (Higher throughput protocol)

Description

The Oligo GEMicroarray[®] Human Atherosclerosis Microarray profiles the expression of 113 key genes involved in atherosclerosis. This array contains genes involved in the many biological processes involved in atherosclerosis including blood coagulation, circulation, cell-adhesion, stress response, lipid transport and metabolism, cell growth, proliferation and apoptosis. Through a simple side-by-side hybridization experiment you can determine differential gene expression between your samples.

Functional Gene Groupings

Response to Stress:

Inflammatory Response: CCL11, CCL2, CCL20, CCL5, CCR1, CCR2, IL1R1, IL1R2, IL8, ITGB2, NFKB1, NOS3, PTGS2, SELE, SPP1, TNF, CD40 (TNFRSF5).

Response to Oxidative Stress: APOE, CCL5, SOD1, SOD2.

Response to Pest, Pathogen or Parasite: CCL2, CCL20, CCR2, CSF2, CSF3, FN1, IL13, IL1B, IL4, IL6, IL7, ITGB2, TNF, CD40 (TNFRSF5).

Response to Virus: CCL11, CCL5, IFNAR2, TNF.

Response to Wounding: CCR1, CCR2, CTGF, FN1, PDGFB, TNF, VWF.

Other Genes Related to the Response to Stress: APOA2, IFNG, PPARG, VEGF.

Apoptosis:

Anti-apoptosis: BCL2, BCL2A1, BCL2L1, BIRC3, CCL2, CFLAR, IL1A, IL2, NFKB1, SERPINB2, SPP1, TGFB1, TNF, TNFAIP3, FAS (TNFRSF6).

Induction of Apoptosis: APOE, BAX, BID, CFLAR, FAS (TNFRSF6).

Other Genes Related to Apoptosis: IL1B, IL5, ITGB2, CD40 (TNFRSF5).

Blood Coagulation and Circulation:

Blood Coagulation: CD36, F7, FGA, FGB, ITGA2, ITGB3, LPA, SERPINE1.

Circulation: APOA1, APOA4, APOB, APOE, COL3A1, DSCR1, ELN, ENG, LPA, LPL, NPY, OLR1.

Platelet Activation: PDGFA, PDGFB, PDGFRB, CD40 (TNFRSF5), VWF.

Regulation of Blood Pressure: ACE, FGA, FGB.

Adhesion Molecules:

Cell-cell Adhesion: CD44, CDH5, ICAM1, ICAM2, ITGB2, SELE, SELL, TNF, VCAM1, VEGF.

Cell-matrix Adhesion: CD44, ITGA2, ITGA5, ITGAX, ITGB2, ITGB3, ITGB5, ITGB7, SPP1.

Other Genes Involved in Adhesion: CCL11, CCL2, CCL5, CCR1, CD36, CTGF, ELN, ENG, FN1, IL8, LAMA1, SCARB1, SELPLG, THBS4, TNC, VWF.

Extracellular Matrix (ECM) Molecules:

ECM Protease Inhibitors: LPA, SERPINB2, SERPINE1.

ECM Proteases: ACE, MMP1, MMP3, MMP9.

Extracellular Matrix Structural Constituents: COL3A1, ELN, FN1.

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Other Extracellular Molecules: ADFP, APOA1, APOA2, APOA4, APOB, APOE, CCL11, CCL2, CCL20, CCL5, CSF2, CSF3, CTGF, HBEGF (DTR), F7, FGA, FGB, FGF2, IFNAR2, IFNG, IL13, IL1A, IL1B, IL2, IL3, IL4, IL5, IL6, IL7, IL8, LAMA1, LCAT, LIF, LPL, NPY, PDGFA, PDGFB, PLTP, SPP1, THBS4, TNC, VEGF, VWF.

Lipid Transport and Metabolism:

Cholesterol Metabolism: ABCA1, APOA1, APOB, APOE, CETP, IL4, LCAT, LDLR.

Fatty Acid Metabolism: CD36, FABP3, LPL, PPARA, PTGS1, PTGS2.

Lipid Transport: ABCA1, APOA1, APOA2, APOA4, APOB, APOE, CETP, FABP3, LDLR, LPA, LPL, MSR1, PLTP.

Lipoprotein Metabolism: APOA1, APOA2, APOA4, APOE, LDLR, LPL.

Steroid Metabolism: NR1H3, PPARA, PPARD, PPARG, RXRA.

Other Genes Related to Lipid Metabolism: ADFP, APOA2, APOA4, APOE, LPA, PLTP.

Cell Growth and Proliferation:

Growth Factors and Receptors: CSF2, KDR, PDGFRB, SPP1.

Negative Regulation of Cell Proliferation: BCL2, FABP3, IL1A, IL1B, IL6, IL8.

Positive Regulation of Cell Proliferation: CSF1, CSF3, HBEGF (DTR), FGA, FGB, FGF2, IL2, IL3, IL5, IL6, IL7, LIF, VEGF.

Regulation of Cell Cycle: DUSP6, FGF2, IL1A, IL1B, PDGFA, PDGFB, TGFB1, TGFB2, TGFB3, VEGF.

Other Genes Involved in Cell Growth and Proliferation: CTGF, ELN, IFNG, IL13, IL4, NPY, CD40 (TNFRSF5).

Transcription Regulators:

Nuclear Receptors: NR1H3, PPARA, PPARD, PPARG, RXRA.

Other Transcription Regulators: DSCR1, EGR1, IL8, KLF2, NFKB1, SOD2, TNF, TNFAIP3.

References

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2. Henriksen PA, Kotelevtsev Y. Application of gene expression profiling to cardiovascular disease. *Cardiovasc Res.* 2002 Apr; 54 (1): 16-24.
3. Monajemi H, Arkenbout EK, Pannekoek H. Gene expression in atherogenesis. *Thromb Haemost.* 2001 Jul; 86 (1): 404-12.
4. Depre C, Tomlinson JE, Kudej RK, Gaussin V, Thompson E, Kim SJ, Vatner DE, Topper JN, Vatner SF. Gene program for cardiac cell survival induced by transient ischemia in conscious pigs. *Proc Natl Acad Sci U S A.* 2001 Jul 31; 98 (16): 9336-41.
5. Friddle CJ, Koga T, Rubin EM, Bristow J. Expression profiling reveals distinct sets of genes altered during induction and regression of cardiac hypertrophy. *Proc Natl Acad Sci U S A.* 2000 Jun 6; 97 (12): 6745-50.
6. Shiffman D, Porter JG. Gene expression profiling of cardiovascular disease models. *Curr Opin Biotechnol.* 2000 Dec; 11 (6): 598-601.
7. Shiffman D, Mikita T, Tai JT, Wade DP, Porter JG, Seilhamer JJ, Somogyi R, Liang S, Lawn RM. Large scale gene expression analysis of cholesterol-loaded macrophages. *J Biol Chem.* 2000 Dec 1; 275 (48): 37324-32.
8. Topper JN, Cai J, Falb D, Gimbrone MA Jr. Identification of vascular endothelial genes differentially responsive to fluid mechanical stimuli: cyclooxygenase-2, manganese superoxide dismutase, and endothelial cell nitric oxide synthase are selectively up-regulated by steady laminar shear stress. *Proc Natl Acad Sci U S A.* 1996 Sep 17; 93 (19): 10417-22.

Product Specification Sheet

Oligo GEArray[®] Human Atherosclerosis Microarray

Array Layout:

RPS27A	ARCA1	ACE	ADFP	APOA1	APOA2	APOA4	APOB
1	2	3	4	5	6	7	8
APOE	BAX	BCL2	BCL2A1	BCL2L1	BID	BIRC3	CCL11
9	10	11	12	13	14	15	16
CCL2	CCL20	CCL5	CCR1	CCR2	CD36	CD44	CDH5
17	18	19	20	21	22	23	24
CETP	CFLAR	COL3A1	CSF1	CSF2	CSF3	CTGF	DSCR1
25	26	27	28	29	30	31	32
HBEGF	DUSP6	EGR1	ELN	ENG	F7	FABP3	FGA
33	34	35	36	37	38	39	40
FGB	FGF2	FN1	ICAM1	ICAM2	IFNAR2	IFNG	IL13
41	42	43	44	45	46	47	48
IL1A	IL1B	IL1R1	IL1R2	IL2	IL3	IL4	IL5
49	50	51	52	53	54	55	56
IL6	IL7	IL8	ITGA2	ITGA5	ITGAX	ITGB2	ITGB3
57	58	59	60	61	62	63	64
ITGB5	ITGB7	KDR	KLF2	LAMA1	LCAT	LDLR	LIF
65	66	67	68	69	70	71	72
LPA	LPL	MMP1	MMP3	MMP9	MSR1	NFKB1	NOS3
73	74	75	76	77	78	79	80
NPY	NR1H3	OLR1	PDGFA	PDGFB	PDGFRB	PLTP	PPARA
81	82	83	84	85	86	87	88
PPARD	PPARG	PTGS1	PTGS2	RXRA	SCARB1	SELE	SELL
89	90	91	92	93	94	95	96
SEPLG	SERPINE2	SERPINE1	SOD1	SOD2	SPP1	TGFB1	TGFB2
97	98	99	100	101	102	103	104
TGFB3	THBS4	TNC	TNF	TNFAIP3	CD40	FAS	VCAM1
105	106	107	108	109	110	111	112
VEGF	VWF	PUC18	Blank	Blank	AS1R2	AS1R1	AS1
113	114	115	Blank	Blank	118	119	120
GAPD	B2M	HSPCB	HSPCB	ACTB	ACTB	BAS2C	BAS2C
121	122	123	124	125	126	127	128

Gene Table

Position	UniGene	GenBank	Symbol	Description	Gene Name
1	Hs.311640	NM_002954	RPS27A	Ribosomal protein S27a	CEP80/HUBCEP80
2	Hs.429294	NM_005502	ARCA1	ATP-binding cassette, sub-family A (ABC1), member 1	ABC-1/ABC1
3	Hs.298469	NM_152831	ACE	Angiotensin I converting enzyme (peptidyl-dipeptidase A) 1	ACE1/CD143
4	Hs.3416	NM_001122	ADFP	Adipose differentiation-related protein	ADRP
5	Hs.568263	NM_000039	APOA1	Apolipoprotein A-I	MGC117399
6	Hs.237658	NM_001643	APOA2	Apolipoprotein A-II	APOA2
7	Hs.1247	NM_000482	APOA4	Apolipoprotein A-IV	APOA4
8	Hs.120759	NM_000384	APOB	Apolipoprotein B (including Ag(x) antigen)	FLDB
9	Hs.515465	NM_000041	APOE	Apolipoprotein E	AD2/apoprotein
10	Hs.159428	NM_004324	BAX	BCL2-associated X protein	Bax zeta
11	Hs.150749	NM_000633	BCL2	B-cell CLL/lymphoma 2	Bcl-2
12	Hs.227817	NM_004049	BCL2A1	BCL2-related protein A1	BCL2L5/BFL1
13	Hs.516966	NM_138578	BCL2L1	BCL2-like 1	BCL-XL/S
14	Hs.474150	NM_001196	BID	BH3 interacting domain death agonist	MGC15319
15	Hs.127799	NM_001165	BIRC3	Baculoviral IAP repeat-containing 3	AIP1/AIP2
16	Hs.54460	NM_002986	CCL11	Chemokine (C-C motif) ligand 11	SCYA11
17	Hs.303649	NM_002982	CCL2	Chemokine (C-C motif) ligand 2	GDCF-2/GDCF-2 HC11
18	Hs.75498	NM_004591	CCL20	Chemokine (C-C motif) ligand 20	CKb4/LARC
19	Hs.514821	NM_002985	CCL5	Chemokine (C-C motif) ligand 5	D17S136E/RANTES
20	Hs.301921	NM_001295	CCR1	Chemokine (C-C motif) receptor 1	CKR-1/CMKBR1
21	Hs.511794	NM_000648	CCR2	Chemokine (C-C motif) receptor 2	CC-CKR-2/CCR2A
22	Hs.120949	NM_000072	CD36	CD36 antigen (collagen type I receptor, thrombospondin receptor)	FAT/GP3B
23	Hs.459142	NM_000610	CD44	CD44 antigen (Indian blood group)	CDW44/ECMR-III
24	Hs.76206	NM_001795	CDH5	Cadherin 5, type 2, VE-cadherin (vascular epithelium)	7B4
25	Hs.89538	NM_000078	CETP	Cholesteryl ester transfer protein, plasma	CETP
26	Hs.390736	NM_003879	CFLAR	CASP8 and FADD-like apoptosis regulator	CASH/CASP8AP1
27	Hs.443625	NM_000090	COL3A1	Collagen, type III, alpha 1 (Ehlers-Danlos syndrome type IV, autosomal dominant)	EDS4A
28	Hs.173894	NM_000757	CSF1	Colony stimulating factor 1 (macrophage)	MCSF
29	Hs.1349	NM_000758	CSF2	Colony stimulating factor 2 (granulocyte-macrophage)	GMCSF
30	Hs.2233	NM_000759	CSF3	Colony stimulating factor 3 (granulocyte)	G-CSF/GCSF
31	Hs.410037	NM_001901	CTGF	Connective tissue growth factor	CCN2/IGFBP8
32	Hs.282326	NM_004414	DSCR1	Down syndrome critical region gene 1	ADAPT78/CSP1
33	Hs.799	NM_001945	HBEGF	Heparin-binding EGF-like growth factor	DTR/DTS
34	Hs.298654	NM_001946	DUSP6	Dual specificity phosphatase 6	MKP3/PYST1
35	Hs.326035	NM_001964	EGR1	Early growth response 1	AT225/GOS30
36	Hs.252418	NM_000501	ELN	Elastin (supraaortic aortic stenosis, Williams-Beuren syndrome)	SVAS/WBS
37	Hs.76753	NM_000118	ENG	Endoglin (Osler-Rendu-Weber syndrome 1)	CD105/END
38	Hs.36989	NM_000131	F7	Coagulation factor VII (serum prothrombin conversion accelerator)	F7
39	Hs.112669	NM_004102	FABP3	Fatty acid binding protein 3, muscle and heart (mammary-derived growth inhibitor)	FABP11/H-FABP
40	Hs.351593	NM_000508	FGA	Fibrinogen alpha chain	Fib2
41	Hs.300774	NM_005141	FGB	Fibrinogen beta chain	MGC104327
42	Hs.284244	NM_002006	FGF2	Fibroblast growth factor 2 (basic)	BFGF/FGFB
43	Hs.203717	NM_002026	FN1	Fibronectin 1	CI/G/DFKzP686F10164
44	Hs.515126	NM_000201	ICAM1	Intercellular adhesion molecule 1 (CD54), human rhinovirus receptor	BB2/CD54
45	Hs.431460	NM_000873	ICAM2	Intercellular adhesion molecule 2	CD102
46	Hs.549042	NM_000874	IFNAR2	Interferon (alpha, beta and omega) receptor 2	IFN-R/IFN-alpha-REC
47	Hs.856	NM_000619	IFNG	Interferon, gamma	IFG/IFI
48	Hs.845	NM_002188	IL13	Interleukin 13	ALR/IL-13
49	Hs.1722	NM_000575	IL1A	Interleukin 1, alpha	IL-1A/IL1

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Position	UniGene	GenBank	Symbol	Description	Gene Name
50	Hs.126256	NM_000576	IL1B	Interleukin 1, beta	IL-1/IL1-BETA
51	Hs.557403	NM_000877	IL1R1	Interleukin 1 receptor, type I	CD121A/D2S1473
52	Hs.25333	NM_004633	IL1R2	Interleukin 1 receptor, type II	IL1RB
53	Hs.89679	NM_000586	IL2	Interleukin 2	IL-2/TCGF
54	Hs.694	NM_000588	IL3	Interleukin 3 (colony-stimulating factor, multiple)	IL-3/MCGF
55	Hs.73917	NM_000589	IL4	Interleukin 4	BSF1/IL-4
56	Hs.2247	NM_000879	IL5	Interleukin 5 (colony-stimulating factor, eosinophil)	EDF/IL-5
57	Hs.512234	NM_000600	IL6	Interleukin 6 (interferon, beta 2)	BSF2/HGF
58	Hs.536926	NM_000880	IL7	Interleukin 7	IL-7
59	Hs.624	NM_000584	IL8	Interleukin 8	3-10C/AMCF-I
60	Hs.482077	NM_002203	ITGA2	Integrin, alpha 2 (CD49B, alpha 2 subunit of VLA-2 receptor)	BR/CD49B
61	Hs.505654	NM_002205	ITGA5	Integrin, alpha 5 (fibronectin receptor, alpha polypeptide)	CD49a/FNRA
62	Hs.248472	NM_000887	ITGAX	Integrin, alpha X (antigen CD11C (p150), alpha polypeptide)	CD11C
63	Hs.375957	NM_000211	ITGB2	Integrin, beta 2 (antigen CD18 (p95), lymphocyte function-associated antigen 1; macrophage antigen 1 (mac-1) beta subunit)	CD18/LAD
64	Hs.218040	NM_000212	ITGB3	Integrin, beta 3 (platelet glycoprotein IIIa, antigen CD61)	CD61/GP3A
65	Hs.13155	NM_002213	ITGB5	Integrin, beta 5	Integrin b5
66	Hs.1741	NM_000889	ITGB7	Integrin, beta 7	Integrin b7
67	Hs.479756	NM_002253	KDR	Kinase insert domain receptor (a type III receptor tyrosine kinase)	FLK1/VEGFR
68	Hs.107740	NM_016270	KLF2	Kruppel-like factor 2 (lung)	LKLF
69	Hs.270364	NM_005559	LAMA1	Laminin, alpha 1	LAMA
70	Hs.387239	NM_000229	LCAT	Lecithin-cholesterol acyltransferase	LCAT
71	Hs.213289	NM_000527	LDLR	Low density lipoprotein receptor (familial hypercholesterolemia)	FH/FHC
72	Hs.2250	NM_002309	LIF	Leukemia inhibitory factor (cholinergic differentiation factor)	CDF/D-FACTOR
73	Hs.520120	NM_005577	LPA	Lipoprotein, Lp(a)	AK38/APOA
74	Hs.180878	NM_000237	LPL	Lipoprotein lipase	LIPD
75	Hs.83169	NM_002421	MMP1	Matrix metalloproteinase 1 (interstitial collagenase)	CLG/CLGN
76	Hs.375129	NM_002422	MMP3	Matrix metalloproteinase 3 (stromelysin 1, progelatinase)	SL-1/STMY
77	Hs.297413	NM_004994	MMP9	Matrix metalloproteinase 9 (gelatinase B, 92kDa gelatinase, 92kDa type IV collagenase)	CLG4B/GELB
78	Hs.147635	NM_002445	MSR1	Macrophage scavenger receptor 1	CD204/SCARA1
79	Hs.431926	NM_003998	NFKB1	Nuclear factor of kappa light polypeptide gene enhancer in B-cells 1 (p105)	DKFZp686C01211/EBP-1
80	Hs.511603	NM_000603	NOS3	Nitric oxide synthase 3 (endothelial cell)	ECNOS/NOS III
81	Hs.1832	NM_000905	NPY	Neuropeptide Y	PYY4
82	Hs.438863	NM_005693	NR1H3	Nuclear receptor subfamily 1, group H, member 3	LXR-a/LXRA
83	Hs.412484	NM_002543	OLR1	Oxidized low density lipoprotein (lectin-like) receptor 1	CLEC8A/LOX1
84	Hs.376032	NM_002607	PDGFA	Platelet-derived growth factor alpha polypeptide	PDGF-A/PDGF1
85	Hs.1976	NM_002608	PDGFB	Platelet-derived growth factor beta polypeptide (simian sarcoma viral (v-sis) oncogene)	PDGF2/SIS
86	Hs.509067	NM_002609	PDGFRB	Platelet-derived growth factor receptor, beta polypeptide	CD140B/JTK12
87	Hs.439312	NM_006227	PLTP	Phospholipid transfer protein	lipid transfer protein II
88	Hs.103110	NM_005036	PPARA	Peroxisome proliferative activated receptor, alpha	NR1C1/PPAR
89	Hs.485196	NM_006238	PPARD	Peroxisome proliferative activated receptor, delta	FAAR/NR1C2
90	Hs.162646	NM_015869	PPARG	Peroxisome proliferative activated receptor, gamma	HUMPPARG/NR1C3
91	Hs.201978	NM_000962	PTGS1	Prostaglandin-endoperoxide synthase 1 (prostaglandin G/H synthase and cyclooxygenase)	COX1/COX3
92	Hs.196384	NM_000963	PTGS2	Prostaglandin-endoperoxide synthase 2 (prostaglandin G/H synthase and cyclooxygenase)	COX-2/COX2
93	Hs.20084	NM_002957	RXRA	Retinoid X receptor, alpha	NR2B1
94	Hs.298813	NM_005505	SCARB1	Scavenger receptor class B, member 1	CD36L1/CLA-1
95	Hs.89546	NM_004050	SELE	Selectin E (endothelial adhesion molecule 1)	CD62E/ELAM
96	Hs.82848	NM_000655	SELL	Selectin L (lymphocyte adhesion molecule 1)	CD62L/LAM-1
97	Hs.127346	NM_003006	SELPLG	Selectin P ligand	CD162/PSGL-1
98	Hs.514913	NM_002575	SERPINE2	Serpin peptidase inhibitor, clade B (ovalbumin), member 2	HsT1201/PAI
99	Hs.414795	NM_000602	SERPINE1	Serpin peptidase inhibitor, clade E (nexin, plasminogen activator inhibitor type 1), member 1	PAI/PAI-1
100	Hs.443914	NM_000454	SOD1	Superoxide dismutase 1, soluble (amyotrophic lateral sclerosis 1 (adult))	ALS/ALS1
101	Hs.487046	NM_000636	SOD2	Superoxide dismutase 2, mitochondrial	IPO-B/MNSOD
102	Hs.313	NM_000582	SPP1	Secreted phosphoprotein 1 (osteopontin, bone sialoprotein I, early T-lymphocyte activation 1)	BNSP/BSPI
103	Hs.1103	NM_000660	TGFB1	Transforming growth factor, beta 1 (Camurati-Engelmann disease)	CED/DPD1
104	Hs.133379	NM_003238	TGFB2	Transforming growth factor, beta 2	TGF-beta2
105	Hs.2025	NM_003239	TGFB3	Transforming growth factor, beta 3	TGF-beta3
106	Hs.211426	NM_003248	THBS4	Thrombospondin 4	TSP4
107	Hs.143250	NM_002160	TNC	Tenascin C (hexabrachion)	HXB/TN
108	Hs.241570	NM_000594	TNF	Tumor necrosis factor (TNF superfamily, member 2)	DIF/TNF-alpha
109	Hs.211600	NM_006290	TNFAIP3	Tumor necrosis factor, alpha-induced protein 3	A20/TNFAIP2
110	Hs.472860	NM_001250	CD40	CD40 antigen (TNF receptor superfamily member 5)	Bp50/CDW40
111	Hs.244139	NM_000043	FAS	Fas (TNF receptor superfamily, member 6)	ALP51A/APO-1
112	Hs.109225	NM_001078	VCAM1	Vascular cell adhesion molecule 1	DKFZp779G2333/INCAM-100
113	Hs.73793	NM_003376	VEGF	Vascular endothelial growth factor	VEGFA/VPF
114	Hs.440848	NM_000552	VWF	Von Willebrand factor	F8/WWF/WWD
115	N/A	L08752	PUC18	PUC18 Plasmid DNA	pUC18
116	Blank	Blank	Blank	Blank	
117	Blank	Blank	Blank	Blank	
118	N/A	N/A	AS1R2	Artificial Sequence 1 Related 2 (80% identity)(48/60)	N/A
119	N/A	N/A	AS1R1	Artificial Sequence 1 Related 1 (90% identity)(56/60)	N/A
120	N/A	N/A	AS1	Artificial Sequence 1	N/A
121	Hs.544577	NM_002046	GAPDH	Glyceraldehyde-3-phosphate dehydrogenase	G3PD/GAPD
122	Hs.534255	NM_004048	B2M	Beta-2-microglobulin	B2M
123	Hs.509736	NM_007355	HSPCB	Heat shock 90kDa protein 1, beta	D6S182/HSP90-BETA
124	Hs.509736	NM_007355	HSPCB	Heat shock 90kDa protein 1, beta	D6S182/HSP90-BETA
125	Hs.520640	NM_001101	ACTB	Actin, beta	b-Actin
126	Hs.520640	NM_001101	ACTB	Actin, beta	b-Actin
127	N/A	N/A	BAS2C	Biotinylated Artificial Sequence 2 Complementary sequence	N/A
128	N/A	N/A	BAS2C	Biotinylated Artificial Sequence 2 Complementary sequence	N/A