

# Oligo GEMArray<sup>®</sup> DNA Microarray: Mouse Diabetes

**Catalog Number**

OMM-023

**Format:**

HybTube (Standard protocol)

**Description**

The Oligo GEMArray<sup>®</sup> Mouse Diabetes Microarray profiles the expression of 84 genes related to the onset, development, and progression of diabetes. They include genes that contribute to obesity, insulin resistance, the early onset of diabetes, and complications from diabetes mellitus. These genes are grouped into six functional categories: receptors, transporters and channels; nuclear receptors; metabolic enzymes; secreted factors; signal transduction proteins; and transcription factors. Many of the genes included have a tissue-specific or tissue-biased expression pattern which can also be affected by different pathophysiological states. This array can be used to study models of obesity and diabetes, to screen for therapeutics and their targets, and to profile the effect of various epidemiological and environmental factors on gene expression in various tissues or cell lines. Through a simple side-by-side hybridization experiment you can determine differential gene expression between your samples with this array.

**Functional Gene Groupings**

**Receptors, Transporters, and Channels:** Abcc8, Adra1a, Adrb3, Aqp2, Axl, Cd28, Ceacam1, Ctl4, Gcgr, Glp1r, H2-Ab1, H2-Eb1, Icam1, Il4ra, Insr, Lepr, Nsf, Rab4a, Sell (LECAM-1), Slc2a4 (GLUT4), Slc14a2, Snap23, Snap25, Stx4a, Stxbp1, Stxbp2, Stxbp4, Tnfrsf1a, Tnfrsf1b, Vamp2, Vamp3, Vapa, Vapb.

**Nuclear Receptors:** Ppara, Pparg.

**Metabolic Enzymes:** Ace, Ace2, Acly, Adn, Adprt1, Capn10, Dpp4, Enpp1, Fasn, Fbp1, G6pc, G6pd2, Gck, Gpd1, Gsk3b, Hmox1, Ide, Lpl, Mod1, Nos3, Pck1, Pfkfb3, Pygl, Scd1.

**Secreted Factors:** Agt, Ccl5 (Rantes), Ccr2 (MCP-1), Gcg, Ifng, Il6, Il10, Il12b, Ins1, Retn, Tgfb1, Tnf, Vegfa.

**Apoptosis and Stress:** Bcl2, Hspb2, Sod2, Tnfrsf6 (Fas).

**Signal Transduction:** Akt2, Dusp4, Ifld2, Igfbp5, Ikbkb (IKKbeta), Inpp1 (SHIP2), Irs1, Irs2, Map2k3, Map2k6, Mapk8 (JNK1), Mapk14 (p38 MAPK), Pik3cd, Pik3r1, Ptpn1 (PTP-1B).

**Transcription Factors:** Cebpa, Cebpb, Cebpd, Foxc2, Foxg1, Foxp3, Hnf4, Ipf1 (PDX-1), Neurod1, Nfkb1, Nrf1, Pax4, Ppargc1, Srebf1, Srebf2, Tcf2 (HNF1b), Ttf1.

**Other Genes Related to Diabetes:** Apoe, B2m, Col1a1, Crp, Serpine1 (PAI-1), Ucp2.

**Storage Conditions**

**Please check the kit components immediately after you receive this package. SuperArray is only responsible for missing items reported within two (2) business days of receipt.**

GEMArray microarrays are shipped at ambient temperature enclosed in either a HybTube or ExpressPak Storage Box. They should be stored at -20°C upon receipt.

## References

1. Morral N. Novel targets and therapeutic strategies for type 2 diabetes. *Trends Endocrinol Metab.* 2003 May-Jun; **14** (4): 169-75.
2. Kelly MA, Rayner ML, Mijovic CH, Barnett AH. Molecular aspects of type 1 diabetes. *Mol Pathol.* 2003 Feb; **56** (1): 1-10.
3. Sreekumar R, Halvatsiotis P, Schimke JC, Nair KS. Gene expression profile in skeletal muscle of type 2 diabetes and the effect of insulin treatment. *Diabetes.* 2002 Jun; **51** (6): 1913-20.
4. Patti ME, Butte AJ, Crunkhorn S, Cusi K, Berria R, Kashyap S, Miyazaki Y, Kohane I, Costello M, Saccone R, Landaker EJ, Goldfine AB, Mun E, DeFronzo R, Finlayson J, Kahn CR, Mandarino LJ. Coordinated reduction of genes of oxidative metabolism in humans with insulin resistance and diabetes: Potential role of PGC1 and NRF1. *Proc Natl Acad Sci U S A.* 2003 Jun 27
5. Mootha VK, Lindgren CM, Eriksson KF, Subramanian A, Sihag S, Lehar J, Puigserver P, Carlsson E, Ridderstrale M, Laurila E, Houstis N, Daly MJ, Patterson N, Mesirov JP, Golub TR, Tamayo P, Spiegelman B, Lander ES, Hirschhorn JN, Altshuler D, Groop LC. PGC-1alpha-responsive genes involved in oxidative phosphorylation are coordinately downregulated in human diabetes. *Nat Genet.* 2003 Jul; **34** (3): 267-273.
6. Armoni M, Kritiz N, Harel C, Bar-Yoseph F, Chen H, Quon MJ, Karnieli E. Peroxisome proliferator-activated receptor gamma represses GLUT4 promoter activity in primary adipocytes, and rosiglitazone alleviates this effect. *J Biol Chem.* 2003 May 30
7. Altomonte J, Richter A, Harbaran S, Suriawinata J, Nakae J, Thung SN, Meseck M, Accili D, Dong H. Inhibition of Foxo1 Function Is Associated with Improved Fasting Glycemia in Diabetic Mice. *Am J Physiol Endocrinol Metab.* 2003 Jun 3

## Product Specification Sheet

### Oligo GEArray<sup>®</sup> Mouse Diabetes Microarray

#### Array Layout:

Gapd 1	Abcc8 2	Ace 3	Ace2 4	Acly 5	Adn 6	Adprt1 7	Adra1a 8
Adrb3 9	Agt 10	Akt2 11	Apoe 12	Aqp2 13	Axl 14	Bcl2 15	Capn10 16
Ccl5 17	Ccr2 18	Cd28 19	Ceacam1 20	Cebpa 21	Cebpb 22	Cebpd 23	Col1a1 24
Crp 25	Ctla4 26	Dpp4 27	Dusp4 28	Enpp1 29	Fasn 30	Fbp1 31	Foxc2 32
Foxg1 33	Foxp3 34	G6pc 35	G6pd2 36	Gcg 37	Gcgr 38	Gck 39	Glp1r 40
Gpd1 41	Gsk3b 42	H2-Ab1 43	H2-Eb1 44	Hmox1 45	Hnf4 46	Hspb2 47	Icam1 48
Ide 49	Ifld2 50	Ifng 51	Igfbp5 52	Ikbbk 53	Il10 54	Il12b 55	Il4ra 56
Il6 57	Inpp1 58	Ins1 59	Insr 60	Ipf1 61	Irs1 62	Irs2 63	Lepr 64
Lpl 65	Map2k3 66	Map2k6 67	Mapk14 68	Mapk8 69	Mod1 70	Neurod1 71	Nfkb1 72
Nos3 73	Nrf1 74	Nsf 75	Pax4 76	Pck1 77	Pfkfb3 78	Pik3cd 79	Pik3r1 80
Ppara 81	Pparg 82	Ppargc1 83	Ptpn1 84	Pygl 85	Rab4a 86	Retn 87	Scd1 88
Sell 89	Serpine1 90	Slc14a2 91	Slc2a4 92	Snap23 93	Snap25 94	Sod2 95	Sreb1 96
Sreb1 97	Stx4a 98	Stxbp1 99	Stxbp2 100	Stxbp4 101	Tcf2 102	Tgfb1 103	Tif1 104
Tnf 105	Tnfrsf1a 106	Tnfrsf1b 107	Tnfrsf6 108	Ucp2 109	Vamp2 110	Vamp3 111	Vapa 112
Vapb 113	Vegfa 114	PUC18 115	Blank 116	Blank 117	AS1R2 118	AS1R1 119	AS1 120
Rps27a 121	B2m 122	Hspcb 123	Hspcb 124	Ppia 125	Ppia 126	BAS2C 127	BAS2C 128

#### Gene Table

Position	UniGene	GenBank	Symbol	Description	Gene Name
1	Mm.333399	NM_008084	Gapd	Glyceraldehyde-3-phosphate dehydrogenase	GAPDH
2	Mm.147824	NM_011510	Abcc8	ATP-binding cassette, sub-family C (CFTR/MRP), member 8	Abcc8
3	Mm.754	J04946	Ace	Angiotensin converting enzyme	Ace
4	Mm.13451	AB053181	Ace2	Angiotensin 1 converting enzyme (peptidyl-dipeptidase A) 2	Ace2
5	Mm.25316	NM_134037	Acly	ATP citrate lyase	Acly
6	Mm.4407	NM_013459	Adn	Adipsin	DF
7	Mm.9248	NM_007415	Adprt1	ADP-ribosyltransferase (NAD <sup>+</sup> : poly (ADP-ribose) polymerase) 1	Adprt1
8	Mm.57064	NM_013461	Adra1a	Adrenergic receptor, alpha 1a	Adra1a
9	Mm.4369	NM_013462	Adrb3	Adrenergic receptor, beta 3	ADRB3,B3bar
10	Mm.8854	NM_007428	Agt	Mus musculus angiotensinogen	angiotensinogen
11	Mm.177194	NM_007434	Akt2	Mus musculus thymoma viral proto-oncogene 2 (Akt2)	AKT-2
12	Mm.138866	NM_009696	Apoe	Apolipoprotein E	APOE
13	Mm.20206	NM_009699	Aqp2	Aquaporin 2	Aqp2
14	Mm.4128	NM_009465	Axl	AXL receptor tyrosine kinase	Axl
15	Mm.347397	NM_009741	Bcl2	B-cell leukemia/lymphoma 2	Bcl-2
16	Mm.29544	NM_011796	Capn10	Calpain 10	Capn10
17	Mm.3370	AF128187	Ccl5	Chemokine (C-C motif) ligand 5; small inducible cytokine A5	Scya5/RANTES
18	Mm.6272	U51717	Ccr2	Chemokine (C-C) receptor 2	Cmkbr2/MIP-1a
19	Mm.255003	M34563	Cd28	CD28 antigen	TP44
20	Mm.14114	NM_011926	Ceacam1	CEA-related cell adhesion molecule 1, or carcinoembryonic antigen (CEA)-like antigen	hepatitis virus receptor
21	Mm.34537	NM_007678	Cebpa	CCAAT/enhancer binding protein (C/EBP), alpha	C/EBP a
22	Mm.4863	AW320793	Cebpb	CCAAT/enhancer binding protein (C/EBP), beta	C/EBP beta
23	Mm.4639	NM_007679	Cebpd	CCAAT/enhancer binding protein (C/EBP), delta	C/EBP delta
24	Mm.22621	U08020	Col1a1	Procollagen, type I, alpha 1	Col1a1
25	Mm.28767	NM_007768	Crp	C-reactive protein, petaxin related	Crp
26	Mm.390	X05719	Ctla4	Cytotoxic T-lymphocyte-associated protein 4	Cd152
27	Mm.1151	NM_010074	Dpp4	Dipeptidylpeptidase 4	Dpp4
28	Mm.170276	NM_176933	Dusp4	Dual specificity phosphatase 4	Dusp4
29	Mm.27254	NM_008813	Enpp1	Ectonucleotide pyrophosphatase/phosphodiesterase 1	Enpp1
30	Mm.3760	NM_007988	Fasn	Murine mRNA fragment for fatty acid synthase (EC 2.3.1.85)	fatty acid synthase
31	Mm.30154	NM_019395	Fbp1	Fructose biphosphatase 1	Fbp1
32	Mm.14092	NM_013519	Foxc2	Forkhead box C2	MFH-1
33	Mm.4704	NM_008241	Foxg1	Forkhead box G1	Hfbbf1
34	Mm.182291	NM_054039	Foxp3	Forkhead box P3	Foxp3
35	Mm.18064	NM_008061	G6pc	Glucose-6-phosphatase, catalytic	G6pc
36	Mm.56918	NM_019468	G6pd2	Glucose-6-phosphatase dehydrogenase 2	G6pd2
37	Mm.45494	AF276754	Gcg	Glucagon	Gcg
38	Mm.22329	NM_008101	Gcgr	Glucagon receptor	Gcgr
39	Mm.220358	NM_010292	Gck	Glucokinase	Gck
40	Mm.140772	NM_021332	Glp1r	Glucagon-like peptide 1 receptor	GLP1R
41	Mm.252391	NM_010271	Gpd1	Glycerol-3-phosphate dehydrogenase 1 (soluble)	Gdc1

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Position	UniGene	GenBank	Symbol	Description	Gene Name
42	Mm.34370	AF156099	Gsk3b	Mus musculus glycogen synthase kinase 3 beta	GSK-3
43	Mm.6716	NM_010379	H2-Ab1	Histocompatibility 2, class II antigen A, beta 1	H2-Ab1
44	Mm.22564	NM_010382	H2-Eb1	Histocompatibility 2, class II antigen E beta	H2-Eb1
45	Mm.17980	NM_010442	Hmox1	Mus musculus heme oxygenase (decycling) 1	HMOX1
46	Mm.202383	NM_008261	Hnf4	Hepatic nuclear factor 4	Hnf4
47	Mm.1980	NM_024441	Hspb2	Heat shock protein 2	Hspb2
48	Mm.90364	M31585	Icam1	Intercellular adhesion molecule	ICAM-1
49	Mm.28366	NM_031156	Ide	Insulin degrading enzyme	Ide
50	Mm.276018	NM_175093	Iffid2	Induced in fatty liver dystrophy 2	Iffid2
51	Mm.529	AK089574	Iffng	Interferon gamma	IFN r
52	Mm.578	L12447	Igfbbp5	Insulin-like growth factor binding protein 5	Igfbbp5
53	Mm.28269	AF026524	Ikkkb	Inhibitor of kappa light polypeptide gene enhancer in B-cells, kinase beta	IKK-b
54	Mm.874	NM_010548	Il10	Interleukin 10	IL-10
55	Mm.997	NM_008352	Il12b	Interleukin 12B	IL-12B
56	Mm.1009	NM_010557	Il4ra	Interleukin 4 receptor, alpha	IL-4R
57	Mm.1019	NM_031168	Il6	Interleukin 6	IL-6
58	Mm.153865	AF162781	Inpp1	Inositol polyphosphate phosphatase-like 1	Inpp1
59	Mm.46269	AK008358	Ins1	Insulin 1	Insulin I
60	Mm.46791	NM_010568	Insr	Insulin receptor	Insr
61	Mm.4949	NM_008814	Ipf1	Insulin promoter factor 1, homeodomain transcription factor	Pdx1
62	Mm.4952	X69722	Irs1	Insulin receptor substrate 1	Irs1
63	AF090738	AF090738	Irs2	Insulin receptor substrate 2	Irs2
64	Mm.259282	NM_010704	Lepr	Leptin receptor	Lepr
65	Mm.1514	NM_008509	Lpl	Mus musculus lipoprotein lipase (Lpl)	LPL
66	Mm.18494	X93150	Map2k3	Mitogen activated protein kinase kinase 3	MKK3
67	Mm.14487	U39066	Map2k6	Mitogen activated protein kinase kinase 6	MKK6
68	Mm.4437	D83073	Mapk14	Mitogen-activated protein kinase 14	p38 MAPK
69	Mm.21495	AB005663	Mapk8	Mitogen activated protein kinase 8	JNK1
70	Mm.148155	NM_008615	Mod1	Malic enzyme, supernatant	Mod1
71	Mm.4636	NM_010894	Neurod1	Neurogenic differentiation 1	Neurod1
72	Mm.3420	M57999	NfkB1	Nuclear factor of kappa light chain gene enhancer in B-cells 1, p105	NFKB1
73	Mm.12837	NM_008713	Nos3	Mus musculus nitric oxide synthase 3, endothelial cell	NOS3
74	Mm.259258	NM_010938	Nrf1	Nuclear respiratory factor 1	Nrf1
75	Mm.260117	NM_008740	Nsf	N-ethylmaleimide sensitive fusion protein	Nsf
76	Mm.8026	XM_133023	Pax4	Paired box gene 4	Pax4
77	Mm.266867	NM_011044	Pck1	Phosphoenolpyruvate carboxykinase 1, cytosolic	Pck1
78	Mm.19669	NM_133232	Pfkfb3	6-phosphofructo-2-kinase/fructose-2,6-biphosphatase 3	Pfkfb3
79	Mm.131916	NM_008840	Pik3cd	Phosphatidylinositol 3-kinase catalytic delta polypeptide	Pik3cd
80	Mm.3058	NM_011085	Pik3r1	Phosphatidylinositol 3-kinase, regulatory subunit, polypeptide 1 (p85 alpha)	PI3Kp85a
81	Mm.1373	NM_011144	Ppara	Peroxisome proliferator activated receptor alpha	Ppara
82	Mm.3020	NM_011146	Pparg	Peroxisome proliferator activated receptor gamma	Pparg
83	Mm.10707	NM_008904	Ppargc1	Peroxisome proliferator activated receptor, gamma, coactivator 1	Ppargc1
84	Mm.2668	NM_011201	Ptpn1	Protein tyrosine phosphatase, non-receptor type 1	Ptpn1
85	Mm.30047	NM_133198	Pygl	Liver glycogen phosphorylase	Pygl
86	Mm.9221	NM_009003	Rab4a	RAB4A, member RAS oncogene family	Rab4a
87	Mm.1181	NM_022984	Retn	Resistin	Retn
88	Mm.267377	NM_009127	Scd1	Stearoyl-Coenzyme A desaturase 1	Scd1
89	Mm.1461	NM_011346	Sell	Selectin, lymphocyte	L-selectin
90	Mm.1263	M33960	Serpine1	Mouse plasminogen activator inhibitor, Serine proteinase inhibitor	PAI-1
91	Mm.44158	NM_030683	Slc14a2	Solute carrier family 14 (urea transporter), member 2	Slc14a2
92	Mm.10661	AB008453	Slc2a4	Solute carrier family 2 (facilitated glucose transporter), member 4	GLUT4
93	Mm.30197	NM_009222	Snap23	Synaptosomal-associated protein 23	SNAP-23
94	Mm.4435	NM_011428	Snap25	Synaptosomal-associated protein 25	SNAP-25
95	Mm.2597	NM_013671	Sod2	Mus musculus superoxide dismutase 2, mitochondrial	SOD2
96	Mm.214958	AF374266	Sreb1	Sterol regulatory element binding factor 1	Sreb1
97	Mm.38016	AF374267	Sreb2	Sterol regulatory element binding factor 2	Sreb2
98	Mm.24867	NM_009294	Stx4a	Mus musculus syntaxin 4A (placental)	Syntaxin 4A
99	Mm.278865	NM_009295	Stxbp1	Syntaxin binding protein 1	Stxbp1
100	Mm.7247	NM_011503	Stxbp2	Syntaxin binding protein 2	Munc18-2
101	Mm.347511	NM_011505	Stxbp4	Syntaxin binding protein 4	Stxbp4
102	Mm.7226	NM_009330	Tcf2	Transcription factor 2	Tcf2
103	Mm.9154	NM_011577	Tgfb1	Transforming growth factor, beta 1	TGFB1
104	Mm.89972	NM_009385	Ttfr1	Thyroid transcription factor 1	Ttfr1
105	Mm.1293	NM_013693	Tnf	Mus musculus tumor necrosis factor	Tnf
106	Mm.1258	M59377	Tnfrsf1a	Tumor necrosis factor receptor superfamily, member 1a	TNFR2
107	Mm.2666	M59378	Tnfrsf1b	Tumor necrosis factor receptor superfamily, member 1b	TNFR1
108	Mm.1626	NM_007987	Tnfrsf6	Tumor necrosis factor receptor superfamily, member 6	Fas
109	Mm.144413	NM_011671	Ucp2	Uncoupling protein 2, mitochondrial	Ucp2
110	Mm.28643	NM_009497	Vamp2	Vesicle-associated membrane protein 2	Vamp2
111	Mm.273930	NM_009498	Vamp3	Vesicle-associated membrane protein 3	Vamp3
112	Mm.266767	NM_013933	Vapa	Vesicle-associated membrane protein, associated protein A	Vapa
113	Mm.260456	NM_019806	Vapb	Vesicle-associated membrane protein, associated protein B and C	Vapb
114	Mm.31540	M95200	Vegfa	Vascular endothelial growth factor A	VEGF/VEGI
115	N/A	L08752	PUC18	PUC18 Plasmid DNA	pUC18
116	Blank	Blank	Blank	Blank	0
117	Blank	Blank	Blank	Blank	0
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	Mm.180003	NM_024277	Rps27a	Ribosomal protein S27a	Rps27a
122	Mm.163	NM_009735	B2m	Beta-2 microglobulin	B2m
123	Mm.2180	NM_008302	Hspcb	Heat shock protein 1, beta	Hsp84
124	Mm.2180	NM_008302	Hspcb	Heat shock protein 1, beta	Hsp84
125	Mm.5246	NM_008907	Ppia	Peptidylprolyl isomerase A	CyclophilinA
126	Mm.5246	NM_008907	Ppia	Peptidylprolyl isomerase A	CyclophilinA
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