



0.5/180	4.0/100	4.0/180	4.0/300	4.0/400
0.05	0.00	0.04	0.23	0.56
0.04	0.01	0.10	0.37	0.63
0.04	0.01	0.08	0.36	0.60
0.04	0.02	0.03	0.39	
0.05	0.02	0.07	0.49	
	0.04	0.05	0.36	
	0.02	0.09	0.44	
	0.07	0.05	0.31	
	0.01	0.08	0.38	
			0.23	

0.5/180	4.0/100	4.0/180	4.0/300	4.0/400
0.06	0.15	0.16	0.23	0.23
0.06	0.01	0.14	0.19	0.11
0.08	0.03	0.06	0.21	0.20
0.06	0.01	0.08	0.26	
0.06	0.05	0.12	0.18	
	0.12	0.10	0.27	
	0.10	0.12	0.17	
	0.09	0.07	0.19	
	0.17	0.11	0.07	
			0.13	

A

RC-fed

Glucose(mM)	Glycogen Synthesis via Direct Pathway
9.6	0.12
15.0	0.73
9.5	0.10
18.9	0.66
18.5	0.57
11.4	0.02
9.8	0.15
14.7	0.75
14.5	0.27
19.7	0.50
15.2	0.50
10.8	0.09
8.4	0.26
13.8	0.42
8.3	0.12
19.1	0.58
14.4	0.68
9.2	0.12
11.2	0.15
15.8	0.37
15.1	0.56
9.7	0.09
9.2	0.23
4.2	0.04
4.6	0.00
4.7	0.01
9.5	0.01
9.6	0.01
5.8	0.08
5.8	0.07

HFD-fed

Glucose(mM)	Glycogen Synthesis via Direct Pathway
4.8	0.07
6.7	0.01
8.8	0.10
5.5	0.01
10.9	0.08
15.5	0.36
4.2	0.01
10.7	0.03
15.8	0.36
5.6	0.02
9.0	0.07
16.2	0.39
10.0	0.05
11.1	0.09
15.2	0.37
9.2	0.05
19.6	0.44
10.4	0.08
18.6	0.31
14.0	0.23
23.0	0.56
21.9	0.63
20.5	0.60

B

RC-fed

G6P(mM)	Net Glycogen Synthetic Rate
0.87	0.89
0.44	0.24
0.88	0.82
0.54	0.34
1.06	0.95

HFD-fed

G6P(mM)	Net Glycogen Synthetic Rate
0.50	0.36
0.17	0.02
0.34	0.11
0.30	0.04
0.44	0.55

0.59	0.81
0.87	0.64
0.55	0.49
0.44	0.24
0.58	0.72
0.68	0.87
0.44	0.21
0.72	0.60
0.40	0.17
0.36	0.15
0.38	0.13
0.44	0.21
0.35	0.15

0.44	0.03
0.38	0.19
0.33	0.07
0.37	0.14
0.65	0.57
0.35	0.15
0.40	0.24
0.62	0.56
0.45	0.12
0.40	0.21
0.65	0.79
0.67	0.74
0.88	0.80

A

Peripheral Infusion

Glucose(mM)	Glycogen Synthesis via Direct Pathway
11.3	0.23
9.0	0.08
8.8	0.10
7.7	0.05
10.0	0.13
4.7	0.03
4.6	0.00
4.4	0.00
9.6	0.10
9.5	0.10
9.8	0.15
10.8	0.11
12.7	0.18
8.4	0.26
8.3	0.12
9.2	0.09
11.2	0.15
9.7	0.09
9.2	0.23
10.6	0.24
10.5	0.31
16.5	0.49
15.4	0.41
15.4	0.55
13.1	0.62
15.8	1.15
18.5	0.57

Portal Infusion

Glucose(mM)	Glycogen Synthesis via Direct Pathway
10.3	0.48
9.7	0.39
10.2	0.47
14.0	0.57
9.4	0.36
6.2	0.13
6.7	0.14
6.8	0.13
13.4	0.67
11.8	0.63
20.4	0.65
13.6	0.65
17.7	0.76
10.8	0.66

B

Peripheral Infusion

G6P(mM)	Net Glycogen Synthetic Rate
0.53	0.65
0.42	0.20
0.38	0.30
0.41	0.12
0.49	0.26
0.28	0.09
0.35	0.14
0.49	0.55

Portal Infusion

G6P(mM)	Net Glycogen Synthetic Rate
0.51	0.66
0.56	0.41
0.56	0.44
0.60	0.74
0.64	0.74
0.54	0.98
0.71	0.56
0.40	0.18

0.60	0.72
0.83	0.54
1.07	0.83
1.06	0.75
1.01	1.53
0.88	0.75
1.21	0.80

0.41	0.22
0.48	0.15
1.57	0.89
0.73	0.99
1.14	0.81
0.83	0.93
1.06	0.78

CTR-ASO GCK-ASO

Direct

0.26	0.15
0.10	0.07
0.15	0.13
0.36	0.21
0.23	0.15
0.19	0.18
0.21	0.06
	0.10
	0.16

Indirect

0.09	0.17
0.05	0.07
0.10	0.15
0.22	0.20
0.14	0.15
0.21	0.23
0.15	0.10
	0.14
	0.24

A

0.5/100	0.79
0.5/100	0.84
0.5/100	1.33
0.5/100	1.25
0.5/100	1.12
0.5/100	0.70
0.5/180	1.10
0.5/180	1.06
0.5/180	1.25
0.5/180	0.70
0.5/180	0.94
0.5/180	1.31
4.0/100	1.02
4.0/100	0.76
4.0/100	1.40
4.0/100	0.88
4.0/100	0.67
4.0/100	1.20
4.0/180	1.85
4.0/180	1.50
4.0/180	1.76
4.0/180	1.13
4.0/180	1.33
4.0/180	1.40
4.0/300	2.72
4.0/300	1.82
4.0/300	2.31
4.0/300	2.90
4.0/300	2.45
4.0/300	2.08

B

RC-fed 0.5/180	0.69
RC-fed 0.5/180	0.73
RC-fed 0.5/180	0.97
RC-fed 0.5/180	1.03
RC-fed 0.5/180	0.94
RC-fed 0.5/180	1.57
RC-fed 4.0/180	1.15
RC-fed 4.0/180	1.29
RC-fed 4.0/180	2.04
RC-fed 4.0/180	2.18
RC-fed 4.0/180	1.29
RC-fed 4.0/180	1.67
RC-fed 4.0/180	1.40
RC-fed 4.0/180	1.06



HFD-fed 4.0/180	0.73
HFD-fed 4.0/180	0.66
HFD-fed 4.0/180	1.80
HFD-fed 4.0/180	1.27
HFD-fed 4.0/180	1.35
HFD-fed 4.0/180	0.39
HFD-fed 4.0/180	0.79
HFD-fed 4.0/180	0.50
Portal Infusion 4.0/1	1.75
Portal Infusion 4.0/1	1.96
Portal Infusion 4.0/1	2.79
Portal Infusion 4.0/1	2.08
Portal Infusion 4.0/1	1.48
Portal Infusion 4.0/1	1.65
Portal Infusion 4.0/1	1.78
Portal Infusion 4.0/1	2.25

Body Wight

RC-fed				
Group1	Group2	Group3	Group4	Group5
412	421	449	449	454
409	402	431	402	468
380	399	450	431	427
	429	454	421	424
	446	431	396	412
	426	395	381	405
		363	458	398
		340	435	367
		386	456	415
			428	432
			440	422
			436	448
			361	353

HFD-fed	
Group1	Group2
409	399
415	420
393	411
	396
	395

Liver TG

RC-fed				
Group1	Group2	Group3	Group4	Group5
5	9	9	11	5
7	13	7	6	11
9	9	6	8	9
	4	6	7	12
	6	3	7	8
	9	4	8	6
		10	9	7
		8	3	6
			7	9
				7

HFD-fed	
Group1	Group2
15	23
18	15
18	17
	23
	17

Plasma Human Insulin

0 min.

RC-fed				
Group1	Group2	Group3	Group4	Group5
0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0

HFD-fed	
Group1	Group2
0.0	0.0
0.0	0.0
0.0	0.0

30 min.

RC-fed				
Group1	Group2	Group3	Group4	Group5
5.8	7.7	49	54	70
5.6	6.4	74	79	82
6.7	5.1	71	66	95
	6.2	88	81	65
	5.1	79	80	70

HFD-fed	
Group1	Group2
10	7.2
6.7	4.7
2.4	6.8
	8.4
	5.7

	5.3		60	67
			83	59
			73	57
			79	77
				92

90 min.

RC-fed

Group1	Group2	Group3	Group4	Group5
10.1	12	81	69	72
6.8	7.4	77	80	94
7.7	7.8	64	98	106
	7.8	77	67	113
	5.3	114	83	75
	9.7		74	86
			86	72
			82	69

HFD-fed

Group1	Group2
11.4	9.5
4.9	6.1
8.6	7.0
	13.7
	7.6

Plasma Rat C-peptide

0 min.

RC-fed

Group1	Group2	Group3	Group4	Group5
386	641	438	764	771
543	514	492	457	533
429	257	495	321	492
	310		367	248
				333
				565

HFD-fed

Group1	Group2
662	492
397	437
446	383
	633

90 min.

RC-fed

Group1	Group2	Group3	Group4	Group5
2	13	21	3	18
1	0	0	0	9
0	0	0	0	0
	0		0	0
				0

HFD-fed

Group1	Group2
4	21
0	10
0	0

Group3	Group4	Group5	4.0/400
397	412	396	389
417	423	419	381
409	419	395	434
398	399	428	
395	425	415	
392	384	379	
383	394	433	
431	406	410	
458	445	393	
		396	

Group3	Group4	Group5	4.0/400
16	27	15	17
14	11	14	21
16	12	19	15
29	19	20	

Group3	Group4	Group5	4.0/400
0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0

Group3	Group4	Group5	4.0/400
74	70	65	51
69	86	77	90
70	60	70	85
80	69	71	
	69	85	

Group3	Group4	Group5	4.0/400
81	90	69	87
83	97	80	74
75	62	77	85
90	74	81	
	74	95	

Group3	Group4	Group5	4.0/400
423	458	515	388
474	339	630	472
530	513	449	621
726	597	609	
		490	

Group3	Group4	Group5	4.0/400
8	5	10	3
0	2	6	0
0	0	0	0
0	0	0	
		0	

Body Wight

Peripheral Infusion

Group1	Group2	Group3	Group4	Group5
403	401	420	424	425
378	339	377	398	403
407	423	334	379	385
	433	389	428	408
			425	370
			441	397
			395	
			384	
			400	
			384	
			363	
			376	
			407	
			444	
			398	
			409	
			456	
			434	

Portal Infusion

Group1	Group2
401	402
380	360
416	385
	433

Plasma Human Insulin

0 min.

Peripheral Infusion

Group1	Group2	Group3	Group4	Group5
0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0

Portal Infusion

Group1	Group2
0.0	0.0
0.0	0.0
0.0	0.0

30 min.

Peripheral Infusion

Group1	Group2	Group3	Group4	Group5
8.4	7.4	58	80	75
4.4	8.6	69	74	86
7.3	4.7	74	62	66
		87	92	73

Portal Infusion

Group1	Group2
8.6	6.8
6.3	8.0
5.5	6.2

90 min.

Peripheral Infusion

Group1	Group2	Group3	Group4	Group5
8.5	9.3	82	83	73
9.1	8.7	77	71	88
7.6	6.9	74	93	80
		99	89	83

Portal Infusion

Group1	Group2
9.2	6.7
8.5	8.7
6.9	8.0

Plasma Rat C-peptide

0 min.

Peripheral Infusion

Group1	Group2	Group3	Group4	Group5
418	367	513	472	467
424	406	394	436	430
436	496	446	367	481
		387	420	380

Portal Infusion

Group1	Group2
465	520
437	395
403	450

90 min.

Peripheral Infusion

Group1	Group2	Group3	Group4	Group5
7	14	3	11	11
0	1	5	0	1
8	0	13	18	12
		5	4	0

Portal Infusion

Group1	Group2
8	0
10	4
12	20

Group3	Group4	Group5
395	392	419
382	415	412
381	398	376
378	384	406
	424	399
	395	405
	448	391

Group3	Group4	Group5
0.0	0.0	0.0
0.0	0.0	0.0
0.0	0.0	0.0

Group3	Group4	Group5
82	83	97
76	67	82
68	65	57
62	87	60

Group3	Group4	Group5
87	93	76
74	81	74
86	79	88
77	83	94



Group3	Group4	Group5
427	448	415
436	367	430
393	449	383
444	400	496

Group3	Group4	Group5
0	19	2
4	0	5
9	0	7
0	8	4