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The Lactococcus lactis CodY regulon - Identification of a conserved cis-regulatory element

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Den Hengst et al. - Supplementary material

Supplementary Fig. 1

L. lactis sequences used for the identification of overrepresented motifs among CodY-regulated genes

>dppP
AGATAAAAATTTTTTTCAAAAGTTTGTGAAAAGTTTCCGCTATTAAAAAATTAAATGTTAATT
TTCAGAAAACATAACCATTATACTCTACAATTCAGGTTGAATTAAGTATAATACCAATATAA
TAAATTTTCTGACAATAATAAAAATTGCGAAGTCAGACACAATTCATGAAAGAGGGAAATT
ACATGAAGACTTGG
>dppA
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TCGAAGAAGTATAATAGGTCCACGTTTAATTTTCAGAATATTAGAAAATTCGATAGTACTTT
TAGGATTTGGAGAA
>ctrA
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CGGTAAAATACAGTTTATTGAAATTATTTAGTTACAAATTCAGAAAAATGAGGATTTATTAT
GGGATTTATGAGA
>oppD
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CTGTAAAACGTTT
>pepC
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>serC
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>ilvD
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>hisC
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ATATTTATCATTTT
>prtPM
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TTGGATGCAAAGG
>gltBD
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TAAACAAGCCAT
>gltA/citB/icd
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AAGAAAAAATGATT
>asnB
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GATGATTATATGTAATGAAAATAGCGAATTATCGCTATTTTTTGTTTTATTATGAAATTTCCA
GACAATTGTGATATAATATTGAAAATTATAATTATTATTGGGGGAAATTATGTGCGGTTTTTT
ATTTATGGAAAC

Supplementary TABLE 1. Occurrence of CodY-box derivates in the genome of *L. lactis* MG1363

Gene	Position[a]	Sequence	Score[b]
dppP	278	AATTTTCAGAAAATT	11.8
codY	86	AATTGTCAGAAAATT	11.3
serC	44	AATTTTCTGATAATT	11.3
thrA	56	AATTTTCAGATAATT	11.3
ygjD	103	ATTTTTCAGAAAATT	11.3
ytjF	195	AATTTTCGGAAAAAT	11.3
gltA	51	AATTTTCAGAAAATA	11.2
feoA	68	ACTTTTCAGAAAATT	11.1
yghD	44	AATTTTCTGAATATT	11.1
nrdF	187	ATTTTTCAGAAAAAT	11.1
ctrA	60	AATTGTCAGACAATT	10.9
dppA	108	ATTTTTCTGACAATT	10.9
oppD	95	AATTTTCTGAACATT	10.9
metA	195	ATTTTTCCGAAAATT	10.9
ychG	298	TATTTTCAAAAAATT	10.8
dppA	40	ATTATTCTGAAAATT	10.8
lysS	41	TATTTTCAAAAAATT	10.8
dppP	46	AATTTTCTGACAATA	10.7
yeaG	403	ATTTTTCTGAAAATA	10.7
gerCB	234	ATTTTTCAGAAAATA	10.7
yqcE	87	GTTTTTCTGAAAATT	10.7
menD	654	AATTTTCAGAAGAAT	10.7
mfd	397	AATTTTCTAAAAAGT	10.6
dppP	114	AATTTTCAGAAAACA	10.6
yfhC	68	TATTTTCAAAAAAAT	10.6
arsC	642	CATCTTCAGAAAATT	10.6
amtB	46	AATATTCAGAAAATA	10.6
purL	1238	AATTTTCAAAAAACT	10.6
yojB	187	AATTTTCAGAAAAGA	10.6
ilvD	71	AATGTTCTGACAAAT	10.6
ysbD	34	AATTTTTTGAAAAAT	10.6
ysdE	126	AATTTTTTGAAAAAT	10.6
ybaB	103	ATTTTACAGAAAATT	10.5

[a]) Distance of the 3'-end of the CodY-box relative to the position of the initiating codon of the downstream ORF.
[b]) Arbitrary score of similarity of the element with the CodY-box consensus.

Supplementary TABLE 2. Occurrence of CodY-box derivates in the genome of *L. lactis* IL1403

Gene	Position[a]	Sequence	Score[b]
yghD	99	AATTTTCTGAAAATT	11,8
optS	227	AATTTTCAGAAAATT	11,8
feoA	85	AATTTTCTGAAAAAT	11,6
codY	86	AATTTTCTGACAATT	11,4
birA2	156	ATTTTTCTGAAAATT	11,3
yrbI	524	TATTTTCTGAAAAAT	11,3
dinG	710	TATTTTCTGAAAAAT	11,3
thrA	55	AATTTTCAGATAATT	11,3
ygjD	99	ATTTTTCAGAAAATT	11,3
serC	44	AATTATCAGAAAATT	11,3
metA	209	AATTTTCCGAAAAAT	11,2
gltA	51	AATTTTCAGAAAATA	11,2
amtB	47	TATTTTCTGACAATT	11,1
yeiD	243	AATTGTCTGAAAAAT	11,1
pi249	186	TATCTTCTGAAAATT	10,9
ygcC	397	AATTTTCAGAAAAAA	10,9
yeaG	403	TATTTTCTGAAAAGT	10,9
ctrA	60	AATTGTCAGACAATT	10,9
mfd	396	AATTTTCTAAAAAAT	10,9
ywdD	940	AATGGTCAGAAAATT	10,8
noxD	681	AATGGTCAGAAAATT	10,8
pi303	242	ATTTTTCAGATAATT	10,8
ynaD	110	AATTATCGGAAAAAT	10,8
yjiF	199	AATTTTATGAAAATT	10,8
lysS	40	TATTTTCAAAAAATT	10,8
optA	114	TGTTTTCTGAAAATT	10,8
optS	40	AATTTTCAGAATAAT	10,8
optA	108	ATTTTTCTGATAATT	10,8
yceD	309	TTTTTTCTGAAAAAT	10,8
yrbA	112	TATTTACTGAAAATT	10,7
arcB	635	AATTTGCTGAAAAAT	10,7
ileS	170	ATTTTTCTAAAAATT	10,7
ysbD	354	ATTTTTCAAAAAATT	10,7
pepF	133	AATTTTCAGCAAAAT	10,7
pepXP	45	TATTTACTGAAAATT	10,7

[a]) Distance of the 3'-end of the CodY-box relative to the position of the initiating codon of the downstream ORF.

[b]) Arbitrary score of similarity of the element with the CodY-box consensus.

Supplementary TABLE 3. Occurrence of CodY-box derivates in the genome of *S. pneumonia* R6

Gene	Position[a]	Sequence	Score[b]
ilvD	69	AATTTTCAGAAAATT	11,8
ilvE	73	AATTTTCTGAAAATT	11,8
rgg	39	AATTTTCTGAAAAAT	11,6
thrC	42	AATTTTCTGAAAAAT	11,6
IS1381	31	AATTTTCTGAAAAAT	11,6
leuA	34	TATTTTCTGAAAATT	11,5
gapN	55	TATTTTCTGAAAATT	11,5
amiA	72	AATATTCTGAAAATT	11,3
codY	55	AATTATCTGAAAATT	11,3
livJ	46	AATTTTCTGATAATT	11,3
spr0332	59	AATTTTCGGAAAAAT	11,3
asD	16	AATTTTCTAAAAATT	11,2
zwF	79	AATTTTCCGAAAAAT	11,2
gdhA	79	AATTTTCTAAAAATT	11,2
ppmA	53	GATTTTCAGAAAAAT	10,9
hom	8	AATTTTGTGAAAATT	10,8
pnp	128	ATTCTTCAGAAAATT	10,8
mtlD	154	ATTATTCAGAAAATT	10,8
spr0157	18	AATTTTCAGAATAAT	10,8
spr0806	40	CATTATCAGAAAATT	10,7
pepA	221	TATTTTCTGTAAATT	10,6
spr1436	40	TATTATCTGACAATT	10,6
spr1115	209	AAATTTCAGAAAAAT	10,6
gldA	49	AATCGTCAGAAAAAT	10,6
aqpZ	74	GATTTTCAAAAAATT	10,5
thrS	128	TATTTTCTGAAAGTT	10,5
spr0685	23	ATTTTTCAGAAAATC	10,5

[a]) Distance of the 3'-end of the CodY-box relative to the position of the initiating codon of the downstream ORF.
[b]) Arbitrary score of similarity of the element with the CodY-box consensus.

Supplementary TABLE 4. Occurrence of CodY-box derivates in the genome of *B. subtilis* 168

Gene	Position[a]	Sequence	Score[b]
yvbF	221	AATTTTCTGAAAAGT	11,2
glnQ	45	AATTTTCAGAAAAGT	11,2
ytkC	66	ATTTTTCTGAAAAAT	11,1
ytnA	15	AATATTCAGAAAAAT	11,1
phoA	141	ATTTTTCTGAAAAAT	11,1
yerL	157	AATATTCAGAAAAAT	11,1
yufN	114	TATTATCAGAAAATT	11,0
yuiA	21	TATTATCAGAAAATT	11,0
spoIIQ	27	TATTTTCAGAAAAGT	10,9
opuBA	49	ATTTTTCAGACAATT	10,9
lipB	69	AATTTTCAGAAAAAA	10,9
yocS	77	AATTTTCTGAATAAT	10,8
ykrQ	75	AATTTTCTGAAATTT	10,8
ydjJ	242	AATTTTCAGAAATTT	10,8
ykwB	36	TATTTACTGAAAATT	10,7
yfmB	79	ATTTTTCTGAAAATA	10,7
braB	44	TATTATCTGACAATT	10,6
citB	57	AATTTTCTCACAATT	10,6
ynzD	120	TATTTTCAGAAAAAA	10,6
ileS	17	TATTTTCTGAAAAAA	10,6
nasD	106	AATTTTATGAAAAAT	10,6
yxiE	84	AGTTTTCAAAAAATT	10,5
yurP	85	TATTTTCTGAAATTT	10,5
yurF	104	CATTTTCTGACAAAT	10,5
ykuW	119	CATTTTCAGAAAATA	10,5
ybgA	100	TAATTTCTGAAAATT	10,5

[a]) Distance of the 3'-end of the CodY-box relative to the position of the initiating codon of the downstream ORF.
[b]) Arbitrary score of similarity of the element with the CodY-box consensus.

Supplementary TABLE 5. Occurrence of CodY-box derivates in the upstream regions of genes identified by Molle *et al.* (2003) as being direct targets of CodY of *B. subtilis* 168

Gene	Position[a]	Sequence	Score[b]
yufN	114	TATTATCAGAAAATT	11.0
citB	57	AATTTTCTCACAATT	10.6
yurP	85	AAATTTCAGAAAATA	10.2
yhdG	166	ATTTTTCTAACAATT	10.2
gggA	184	TTTTTGCTGAAAATT	10.1
yxbC	70	AATCCTCTGATAATT	10.1
yhjC	144	TAATTTCAGACAATT	10.1
ybgE	103	AAATTTCAGAATATT	10.1
ilvD	48	AATAAACTGAAAATT	9.9
ispA	132	AATCTTCAAAATATT	9.8
appD	83	AATTTTTCGATAATT	9.8
yoaD	8	TTTTTTATGAAAAAT	9.8
ykaA	161	ATTTATCAAAAAAGT	9.6
comK	15	ATTTTGCAGAAAAAG	9.4
citB	135	ACTTATGAGAAAAAT	9.4
yhdG	43	TGAATTCAGAAAATT	9.3
guaB	13	TCTTTTCGGCAAAAT	9.3
acsA	63	TATATTTTAAAAATT	9.3
ybgE	22	AATATTTAAACAATT	9.2
yoaD	187	TTCATTCTGAAAATT	9.1
hutP	11	AAAATTCTGATAACT	9.1
guaB	10	CTTCTTTTGAAAATT	9.1
ureA	47	AATTTGCGGAACAGT	9.1
dppA	28	ATTTGTTAGAATATT	9.1
yusC	19	ACTATTCTAAGAAAT	9.0
ycgM	91	AATAATCAGAATCTT	9.0
ilvD	117	AATTGTCAAAATAAA	9.0
rocA	73	TTTTTTCAGCAAAAG	9.0

[a]) Distance of the 3'-end of the CodY-box relative to the position of the initiating codon of the downstream ORF.
[b]) Arbitrary score of similarity of the element with the CodY-box consensus.