**Supplementary Table S3. List of selected 39 Transcription Factors, their experimentally verified binding sites used for the construction of the corresponding PSSMs and the literary sources and references.**

| No | TF (PA id) | Binding Site Sequence | Binding Region | References |
|---|---|---|---|---|
| 1 | ExsA PA1713 | TGCCGATTCCAGTGAAAAAACGGCGGCCAATC CTGATAGGC | exoS operon(a) | (Hovey&Frank 1995), (Yahr et al, 1995),(Yahr et al, 1996) , (Goranson et al, 1997) |
| | | AATGCCGGGCTAAAAATAACTGACGTTTTTTGA AAGCCCGGTAGCG | exsD-pscBL operon(a) | |
| | | TGTGGCTTTTTTCTTAAAAGAAAAGTCTCTCAG TGACAAAAGC | exsCBA operon(a) | |
| | | GCGGCAAAACCTAAAAAAAGAGAACCACGATT AACAGTCTCTC | orf1 operon(a) | |
| 2 | MexR PA0424 | AAATGTGGTTGATCCAGTCAACTATTTTG | mexAB-oprM operon (re) | (Evans et al, 2001) |
| | | ATTTTAGTTGACCTTATCAACCTTGTTT | mexAB-oprM operon (re) | |
| 3 | Dnr PA0527 | TTGACGGCCGTCAA | hemF operon(a) | (Rompf et al, 1998),(Arai et al, 2003) |
| | | TTGATACAAATCAA | hemN operon(a) | |
| | | TTGACTTTCATCAA | nosRZDFY L operon(a) | |
| 4 | AlgU PA0762 | CGGAACTTTCCTCCGCGCCGTGGCTCTGAACAG CC | new site(a) | (Firoved et al, 2002) |
| | | AAGAACTTTGAGGGCAAGTCGAAGTTCAAAAC GTGG | oprF operon(a) | |
| | | TGGAACTTCACGCCAGCGCAAATGTTCAAAGG GCT | lptA operon(a) | |
| | | CTGAACTTGTCCGGCTGCGTCGTCCTCCCATGT AGA | osmC operon(a) | |
| | | AGGAACTTGAGATCGTGCAGGGTGCTCCAATA TTTC | PA3952 operon(a) | |
| | | GCGAACTTGTCGCAGTCGTGCCGTTCCAAGCA GCC | PA3902 operon(a) | |
| | | TGGAACTTGGTGGTTTTTGCCCAGTCCTAGGCA AGG | ycfJ operon(a) | |
| | | TGGAACTTTCCTTGCGCGCCTTGCATCGCATAC TCAAG | betT2 operon(a) | |
| | | CCGAACTTTGCGAGGAAAAACCGATTCTAACC AAGCCA | dksA operon(a) | |
| | | GTGAACTTTGCCACAAAACGCATATCTGAATCC ATTTG | phuR operon(a) | |
| | | TGGAACTTCTGGCGGGGCGATAGCTCCCATTG AGCCGC | tal operon(a) | |
| | | GAGAACTTTTGCAAGAAGCCCGAGTCTATCTTG GCA | algU operon(a) | |
| | | GGGCACTTTTCGGGCCTAAAGCGAGTCTCAGC GTCG | algR operon(a) | |
| | | TCGAACTTAGGCGCAGAATGTCGGGTCCCACG GACA | PA0856 operon(a) | |
| | | TTGAACTTATCCGCGCGCACCTGTTCCTATTGC CCA | PA3262 operon(a) | |
| | | AGGAACTTATACACCCGCTTGCAGTCAGATATC | rpoH | |

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|---|---|---|---|---|
| | | CGA | operon(a) | |
| | | CGGAACTTCCCTCGCAGAGAAAACATCCTATCACCG | algD-algA operon(a) | |
| | | TGGAACTTTCTTAGACGCATCGGTTCCAAAGCAGGA | algU operon(a) | |
| 5 | PhoB **PA5360** | CTGTCATTCATCCTTAAC | katA gene(a) | (Yuan et al, 2005) |
| 6 | ArgR **PA0893** | CGGGTTGGCGCTATAACAAGTTGTCGCATGGCGGCAATGCCG | aruC operon(a) | (Park et al, 1997), (Ochs et al, 1999), (Lu et al, 1999), (Nishijyo et al, 1998), (Lu&Abdelal 2001), (Lu et al, 2004) |
| | | CGTCGTCTTATTGGTGGACCGGAATGTCGCGATTCTGTAAACTAC | carA operon(re) | |
| | | CTGCGCCTTCCCGATGCTTTCTGTCGCATTTCCGAAAGCCGC | aruC operon(a) | |
| | | CCTCCTTGTGTTTCCGCGACATTTCCTTATAAGATCGCGCCT | argF operon(re) | |
| | | CTTCGGTGCTTTTATAATTAGTTGTCGCATTGAAGAAATAACC | aot + argR operon(a) | |
| | | CGCACCTACGCAGATGCGACATGCGTCATGCAATTTTGCGACA | oprD operon(a) | |
| | | GCGACTTACAGGAATGCGTCATCTAATTACTTTGAGTAGGAA | arcDABC operon(a) | |
| | | TGCTCCCGGGGTGAACGAATATGTCGCAGCACGGTAAGTGTTT | gdhB operon(a) | |
| | | TGTCGCTTTTGCGTCTAAAGCTGTCGCCCCTCTGTAATTTCC | argG operon(re) | |
| | | GCCAGTTACAACGTAGCGACACCTCAGGTCGCCCAGGCGTCA | PA0328 operon(a) | |
| | | GAAAGTTTCAGTTTTGCACCATAAAGATTCATCAATGCGTCA | gdhA operon(re) | |
| | | CCGACTTGTGTTGCCGCGACCTTTTCTTACAAGGGCAAGCCG | adcAB operon(a) | |
| | | CGGCACCGCGAGGCCGCGCCAGCCCTTTCCCTAGATGGGAGA | speA operon(u) | |
| | | CGGACTGTTCTGATTGCGACGTCGTTTTTCAACAAAAGGACA | braZ operon(a) | |
| | | GGTCGCCTCTGCGACATTCGCTGTCGTGTCCCGGCGTGCCGC | PA3934 operon(a) | |
| | | CAGTTTTGTTCCTACGCGACAGCGCACTGCAGCGATGCGACA | PA5152-PA5153 operon(a) | |
| | | GGGATTTCCGGCCTCCCGGCTGGCAATGCGCCTGCGACGACA | ygjU operon(a) | |
| 7 | FleQ **PA1097** | TGTCGGATGATTGACAG | FleSR operon(a) | (Arora et al, 1997), (Jyot et al, 2002) |
| | | TGTCGCTCTGCCGCCA | FleSR operon(a) | |
| | | CCGGCGTCAAAAGTTTGTT | flhA operon(a) | |
| | | AAAAGCCGCGGCTGTT | fliE operon(a) | |
| | | AAACCCTTCATTTGACGCTATAGCGACGGATTTTTGGCATGG | fliL operon(a) | |
| 8 | LasR **PA1430** | ACCCCACCTACCAGAATTGGCAGGGG | hcnABC operon(a) | |
| | | ACCGCGCGTTTCCACCAGGG | hcnABC operon(a) | |
| | | ACCTGCCAGTTCTGGCAGGT | lasB operon(a) | |
| | | CACTGCCAGATCTGGCAGTT | AcpP-like | |

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|---|---|---|---|---|
| | | | operon(a) | (Pessi&Haas 2000),(Whiteley&Greenberg 2001), (Schuster et al, 2004),(Rust et al, 1996),(Whiteley et al, 1999),(de Kievit et al, 2002),(Pesci et al, 1997) |
| | | ACCTACCAGATCTTGTAGTT | phzA1 operon(a) | |
| | | ATCTATCTCATTTGCTAGTT | lasI operon(a) | |
| | | ATCTATCTCATTTGCTAGTT | RsaL operon(a) | |
| | | CCCTACCAGATCTGGCAGGT | rhlL operon(a) | |
| | | TTTTGCCGTATCGGCAAGGC | rhlR operon(a) | |
| | | ACCTGCTTTTCTGCTAGCTA | lasB operon(a) | |
| | | AAAACAACCAGAACAGATAGTTTTTCC | PA0572 operon(u) | |
| | | CCTCCTGAGCAGTTCAGATAGGTTGT | PA3904 operon(u) | |
| | | GCCGGCAACTAGCTATCACTTGGAGTAGCTGG CTGGCCTTCT | PA4677 operon(u) | |
| 9 | Anr **PA1544** | TTGACGTGGATCAG | arcDABC operon(a) | (Rompf et al. 1998), (Pessi&Haas 2000), (Galimand et al, 1991),(Gamper et al, 1991),(Winteler&Haas 1996),(Vijgenboom et al, 1997),(Arai et al, 1995),(Arai et al, 1997) |
| | | TTGACCTGAATCAG | azurin operon(a) | |
| | | CTGTCATGGATCAA | hcnABC operon(a) | |
| | | TTGATACAAATCAA | hemN operon(a) | |
| | | TTGACGGCCGTCAA | hemF operon(a) | |
| | | TTGATCGCGGTCAA | PA0526 operon(u) | |
| | | TTGCCGTGCGTCAA | dnr operon(a) | |
| | | TTGACCGGAATCAA | nirSMCFDL GHJEN/NirQOP operon(a) | |
| | | TTGATTCCTATCAA | narK1 operon(u) | |
| | | TTGTCTCGCGACAA | cioAB operon(u) | |
| | | TTGCTCTGCATCAA | cioAB operon(u) | |
| 10 | PvdS **PA2426** | GCTAATTTT | PA2411-PA2412 operon(a) | |
| | | AGTAAATCC | PA2413 operon(a) | |
| | | GGTAAATTC | PA2427 operon(a) | |
| | | GGCAAATTT | PA2451-PA2452 operon(a) | |
| | | GCTAAATTT | PA2393-PA2395 operon(a) | |

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|---|---|---|---|---|
| | | GGTAAAACG | fpvA operon(a) | (Ochsner et al, 2002), (Wilson et al, 2001), (Hunt et al, 2002) |
| | | GCTAATTAT | PA2424-PA2425 operon(a) | |
| | | GTTAATTTT | PA2400-PA2402 operon(a) | |
| | | CGTAAATTG | pvdF operon(a) | |
| | | GTTAAATTT | PA2389-PA2391 operon(a) | |
| | | GGTAAATTT | PA2392 operon(a) | |
| | | CATAAACGG | PA2531 operon(a) | |
| | | GCGAAGAT | PA5150 operon(a) | |
| | | CTTAAACCG | PA1134(a) | |
| | | TATAAAAAA | PA4175 operon(a) | |
| | | CGTGAATCG | PA0346 operon(a) | |
| | | CTTGAATGG | PA0818 operon(a) | |
| | | ATTAAAACC | PA4833 operon(a) | |
| | | GGTAAATAT | mvfR operon(a) | |
| | | CATAAATCC | toxA operon(a) | |
| | | CTTAAATTT | pvdA operon(a) | |
| | | GCTAAATCC | pvdD operon(a) | |
| | | GATAAATGA | ptxR(a) | |
| | | GCTAGATAC | toxR operon(a) | |
| | | GCTAAATAC | pvdE operon(a) | |
| 11 | RhlR **PA3477** | TCCTGTGAAATCTGGCAGTT | rhlAB operon(a) | (Whiteley& Greenberg 2001), (Whiteley et al. 1999), (Winzer et al, 2000), (Yang et al, 2000) |
| | | ACCTACCAGATCTTGTAGTT | phzA1 operon(a) | |
| | | CACTGCCAGATCTGGCAGTT | AcpP-like operon(a) | |
| | | TCCTGCATGAATTGGTAGGC | pa1L operon(a) | |
| | | CTGTGTTTCCGACAGC | migA operon(a) | |
| | | CTCCAGCGACCGTAGC | migA operon(a) | |
| 12 | Fur **PA4764** | GAAGATGGTAATTAATTGC | tolQRAB operon(re) | |
| | | ACGAACGTGAATCATTCTC | pfeR(re) | |
| | | AATAATCAATCTCATTATC | fagA-sodA operon(re) | |
| | | GAAAACAATAATCAATCTC | fagA-sodA | |

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|---|---|---|---|---|
| | | | operon(re) | (Ochsner et al. 2002), (Ochsner&Vasil 1996),(Ochsner et al, 1995),(Miyazaki et al, 1995),(Hassett et al, 1997),(Ochsner et al, 2000) |
| | | CTGAATGATAATAATTATC | tonB operon(re) | |
| | | GATAATAATTATCAGAAGA | tonB operon(re) | |
| | | CAAAACGCATATCTGAATC | phuR operon(re) | |
| | | GAGATTTATTATCATTGGC | pchR operon(re) | |
| | | GTAATTGACAATCATTATC | pvdS operon(re) | |
| | | CAAAACGCATATCTGAATC | phuR operon(re) | |
| | | GATTCAGATATGCGTTTTG | phuS operon(re) | |
| | | GATAATAAGAATTATTCTC | PA4570 operon(a) | |
| | | CATCATGATGGTAATCAGC | feoAB operon(a) | |
| | | AAAAATGCAAATCTTTCGC | PA4370 operon(a) | |
| | | GATAATAGTTTTCATTTGC | PA4895-4896 operon(a) | |
| | | TAAAATGATAACTATTATC | PA3899-3900 operon(a) | |
| | | GAGATTTCTTATCATTCGT | PA5217 operon(a) | |
| | | GACAATGCGATTCATTATC | PA2467-2468 operon(a) | |
| | | TCCAATGCAAATCAATATC | piuC operon(a) | |
| | | GAAAATCATTATCATAAAA | pig25 operon(a) | |
| | | GATATGTATTATCATTCGC | PA1300-1301 operon(a) | |
| | | GCGAATAATTCTCGTTTTT | fiuR(pig17) operon(a) | |
| | | GAGACTGATTCTTATTACA | hasRA operon(a) | |
| | | GCAAATGCTAATCATTCGC | PA2033-2034 operon(a) | |
| | | CATAATGATAAGCATTATC | fptA operon(a) | |
| | | GACAATCATTCTCATTATT | bfd operon(a) | |
| | | GACATTGAGATTCAATAAC | hemO operon(a) | |
| | | GATGAAGATCGCCATTATC | PA2385 operon(a) | |
| | | ACGATTGCTAATCAATCTT | pirR operon(a) | |
| | | CTTGATGAGAATTATTATA | pig32 operon(a) | |
| | | TAAATTTATAATAATTCTC | PA2388 operon(a) | |

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| | | GGAATGAGATTTATTATC | pchR operon(re) | |
| 13 | Vfr **PA0652** | AAATGTGATCTAGATCACATTT | lasR operon(a) | (Albus et al, 1997),(Hudson&Fried 1990),(Suh et al, 2002),(Dasgupta et al, 2002) |
| | | AATGTGAGTTAGCTCACTCAT | lacZYA operon(r) | |
| | | AAATTGACTAATCGTTCACATTTG | fleQ operon(u) | |
| 14 | OxyR **PA5344** | ATTGATATTCCTAATCGGCGCGGTGAGGTTTTTCAAT | katB operon (a) | (Ochsner et al. 2000) |
| | | ATAGATTTAGATAATTTCACTGATGGCCTAAATCAAT | ahpC operon(a) | |
| 15 | PsrA **PA3006** | CAAACGCCTGTTTG | PA0506 operon(re) | (Kojic et al, 2005) |
| | | CAAACGTTTGTTTG | etfBA operon and PA2953 operon (re) | |
| | | GAAACGTATGTTTC | psrA operon(re) | |
| | | CAAACAAGTGTTTG | psrA operon(re) | |
| | | GAAACCGGGGTTTC | mmsR operon(u) | |
| | | CAAACGGAAGTTTG | rpoS operon(a) | |
| | | GAAACCAGCGTTTC | PA3595 operon(u) | |
| 16 | AlgZ **PA5262** | GTAATCCATTGGCCATTACCAGCCTCCCGCCATTAC | algD-algA operon(a) | (Wozniak&Ohman 1994),(Baynham&Wozniak 1996),(Baynham et al, 1999),(Ramsey et al, 2005) |
| | | GAAGGCCATCATCCAACC | algZ operon(re) | |
| | | CAGATAGCTGGTACTGGCAAAACGCCGGCACGCAACGCA | algZ operon(re) | |
| 17 | PtxS **PA2259** | TGAAACCGGTTTCA | PtxS operon(re) | (Swanson et al, 1999) |
| 18 | MvfR **PA1003** | CAGAGCGTCGACTTCCTGCCCGGCGAACTGCACCTGGGGAGCATGCGCCGG | phnAB operon(a) | (Cao et al, 2001) |
| 19 | CysB **PA1754** | TGTTGAAATTAAAGGCCTTTAGAAACTTGAATTCTATGGACCGAAC | algD-algA operon(a) | (Delic-Attree et al, 1997) |
| 20 | MexT **PA2492** | GTATCACTGTTCGTGATAATCAAAATCTCGTCGTTCGATTAGT | mexEF-oprN multidrug efflux operon(a) | (Kohler et al, 1999) |
| 21 | PilR **PA4547** | TCCAGCTGTCAAAAAATGTCACATCCTGTCCGTTTTAAGTT | pilin operon(a) | (Jin et al, 1994) |

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| 22 | RsaL **PA1431** | TATGAAATTTGCATA | lasI promoter(re) | (Cao et al. 2001), (Rampioni et al, 2006) |
| | | TATGCAATCCACATC | phzA1 promoter(u) | |
| | | TAGCAATCCCGCATA | phzM promoter(u) | |
| | | TACCCACCTGTCATG | phzA promoter(u) | |
| 23 | RpoN **PA4462** | GGGCCCACGCGTTCCA | oprE operon(a) | (Arora et al. 1997), (Jyot et al. 2002), (Wozniak& Ohman 1994), (Yamano et al, 1998) |
| | | GGCACGGGTATTGC | FleSR operon(a) | |
| | | GGAACTTCCCTCGC | algD - algA operon(a) | |
| | | TGGAACGGTTCCTGC | flhA operon(a) | |
| | | TGGCACCCTTGTTGC | fliE operon(a) | |
| | | TGGCACAACCCTTGC | fliL operon(a) | |
| 24 | GlpR **PA3583** | TTTTTTCGAAACTGAACAAT | glpFK operon(u) | (Schweizer et al, 1997), (Schweizer &Po 1996) |
| | | ACCCTTCGAAATTGAAAAAG | glpD operon(re) | |
| | | ACCCTTCGAAATTGAAAAAG | glpD operon(re) | |
| 25 | NarL **PA3879** | TGTTCAT | hemA operon(u) | (Krieger et al, 2002) |
| | | TGTCTAT | hemA operon(u) | |
| | | TACCTCT | narK1 operon(u) | |
| | | TACGGCT | narK1 operon(u) | |
| | | TACCTCC | narK1 operon(u) | |
| 26 | TrpI **PA0037** | ATTCGTGAGTTTTCCTGACAGGT | trpBA operon(a) | (Chang&Crawford 1990),(Chang&Crawford 1991) |
| | | TGCCGCAATCTTATCGGTTTCTT | trpBA operon(a) | |
| 27 | PhhR **PA0873** | CGTAAGGAAAACTTTACG | phhABC operon(a) | (Song&Jensen 1996) |
| | | CGTCAAGAATATGTGACA | phhABC operon(a) | |
| 28 | AguR **PA0294** | TCCGATTTTTATCGGA | aguBA operon(re) | (Nakada et al, 2001) |
| 29 | QscR **PA1898** | ACCTGCCCGGAAGGGCAGGTTGTCCC | PA1897 promoter region(u) | (Lee et al, 2006) |
| | | ACCTTGCCTTTCGGGCAGGTTGGCGG | PA5351 promoter region(u) | |

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| 30 | RpoS **PA3622** | CTGTGCT | lecA promoter region(a) | (Winzer et al. 2000), (Schuster et al. 2004) |
| | | CTTTGCT | lecA promoter region(a) | |
| | | CTTTACT | cheY2 promoter region(u) | |
| | | CTAGTTT | mcpA promoter region(u) | |
| 31 | RpoH **PA0376** | GCATGCCCTTGAAATGGCTTGTGGCGACCTTATGTA | groESL promoter region(a) | (Fujita et al, 1998) |
| 32 | PchR **PA4227** | CTGCAGCGAATGAAAAAGCCCCGCAATCGAAA | pchR-pchD intergenic region (u) | (Michel et al, 2005) |
| 33 | NfxB **PA4600** | TTGATTGAAAACGGATCGAATGGTACTTTTTCGAGCTAA | nfxB gene upstream(re) | (Shiba et al, 1995) |
| | | TTGAGTCAATATTGTCTCAAATGATCTTTTGACAGCTAA | nfxB gene upstream(re) | |
| 34 | IHF **PA3161** **PA2738** (2 subunits) | CAAGGGATTTGTTCA | hemA operon(a) | (Arora et al. 1997), (Wozniak& Ohman 1994), (Delic-Attree et al. 1997), (Yamano et al. 1998), (Krieger et al. 2002), (Wozniak& Ohman 1993) |
| | | CAATACATCGGCAAT | hemA operon(a) | |
| | | CAATGGTTGTCCTGC | hemA operon(a) | |
| | | GTTTCGCAACGCTTTGATTTTCAAATGAAAAAAA | FleSR operon(a) | |
| | | TTAAAGCTATTAAATATGAATAATTAA | oprE operon(a) | |
| | | TAAAAACACTTTTAATTCAATAAGTTA | algB operon(a) | |
| | | CAATAATTTCAGCCGTACCTCTTT | narK1 operon(a) | |
| | | CAACCTGTTG | IHF binding site(a) | |
| | | ATATCAAACGGATA | algD-algA operon(a) | |
| | | CCATCAAGTTGGTA | algD-algA operon(a) | |
| 35 | AlgR **PA5261** | CTCAACCGTTCGTCTGCAAGT | algD-algA operon(a) | (Kato&Chakrabarty 1991), (Mohr et al, 1991) |
| | | TGGCGCTACCGTTCGTCCCTCCG | algD-algA operon(a) | |
| 36 | MvaT **PA4315** | CGATTATTCGGTTTTCATGAACAAC | ptxs-ptxr intergenic region (u) | (Westfall et al, 2004) |
| 37 | SigX **PA1776** | GAAGTTCTGATAAACTTGCCACCCAAGTTGTG | oprf gene upstream region(a) | (Brinkman et al, 1999) |
| 38 | PrtN **PA0610** | ATTGCAGTTTG | S1 pyocin gene | |

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| | | | upstream (a) | |
| | | ATTGCTGTGT | R2 pyocin gene upstream(a) | |
| | | ATTTCCAGTGT | R2 pyocin gene upstream(a) | (Matsui et al, 1993) |
| | | ATTGGCGTTC | R2 pyocin gene upstream(a) | |
| | | ATTGCAGTGG | R2 pyocin gene upstream(a) | |
| | | ATTGTCGAGA | R2 pyocin gene upstream(a) | |
| 39 | PycR **PA5437** | TCCGGTCGCTGCA | pyca-pycr intergenic region(a) | |
| | | CTGCATGACCGGCAG | pyca-pycr intergenic region(a) | (Kukavica-Ibrulj et al, 2008) |
| | | TGACCGGCAGGCA | pyca-pycr intergenic region(a) | |

## References

Albus AM, Pesci EC, Runyen-Janecky LJ, West SE and Iglewski BH (1997). Vfr controls quorum sensing in Pseudomonas aeruginosa. J Bacteriol **179**: 3928-3935.

Arai H, Igarashi Y and Kodama T (1995). Expression of the nir and nor genes for denitrification of Pseudomonas aeruginosa requires a novel CRP/FNR-related transcriptional regulator, DNR, in addition to ANR. FEBS Lett **371**: 73-76.

Arai H, Kodama T and Igarashi Y (1997). Cascade regulation of the two CRP/FNR-related transcriptional regulators (ANR and DNR) and the denitrification enzymes in Pseudomonas aeruginosa. Mol Microbiol **25**: 1141-1148.

Arai H, Mizutani M and Igarashi Y (2003). Transcriptional regulation of the nos genes for nitrous oxide reductase in Pseudomonas aeruginosa. Microbiology **149**: 29-36.

Arora SK, Ritchings BW, Almira EC, Lory S and Ramphal R (1997). A transcriptional activator, FleQ, regulates mucin adhesion and flagellar gene expression in Pseudomonas aeruginosa in a cascade manner. J Bacteriol **179**: 5574-5581.

Baynham PJ, Brown AL, Hall LL and Wozniak DJ (1999). Pseudomonas aeruginosa AlgZ, a ribbon-helix-helix DNA-binding protein, is essential for alginate synthesis and algD transcriptional activation. Mol Microbiol **33**: 1069-1080.

Baynham PJ and Wozniak DJ (1996). Identification and characterization of AlgZ, an AlgT-dependent DNA-binding protein required for Pseudomonas aeruginosa algD transcription. Mol Microbiol **22**: 97-108.

Brinkman FS, Schoofs G, Hancock RE and De Mot R (1999). Influence of a putative ECF sigma factor on expression of the major outer membrane protein, OprF, in Pseudomonas aeruginosa and Pseudomonas fluorescens. J Bacteriol **181**: 4746-4754.

Cao H, Krishnan G, Goumnerov B, Tsongalis J, Tompkins R and Rahme LG (2001). A quorum sensing-associated virulence gene of Pseudomonas aeruginosa encodes a LysR-like transcription regulator with a unique self-regulatory mechanism. Proc Natl Acad Sci U S A **98**: 14613-14618.

Chang M and Crawford IP (1990). The roles of indoleglycerol phosphate and the TrpI protein in the expression of trpBA from Pseudomonas aeruginosa. Nucleic Acids Res **18**: 979-988.

Chang M and Crawford IP (1991). In vitro determination of the effect of indoleglycerol phosphate on the interaction of purified TrpI protein with its DNA-binding sites. J Bacteriol **173**: 1590-1597.

Dasgupta N, Ferrell EP, Kanack KJ, West SE and Ramphal R (2002). fleQ, the gene encoding the major flagellar regulator of Pseudomonas aeruginosa, is sigma70 dependent and is downregulated by Vfr, a homolog of Escherichia coli cyclic AMP receptor protein. J Bacteriol **184**: 5240-5250.

de Kievit TR, Kakai Y, Register JK, Pesci EC and Iglewski BH (2002). Role of the Pseudomonas aeruginosa las and rhl quorum-sensing systems in rhlI regulation. FEMS Microbiol Lett **212**: 101-106.

Delic-Attree I, Toussaint B, Garin J and Vignais PM (1997). Cloning, sequence and mutagenesis of the structural gene of Pseudomonas aeruginosa CysB, which can activate algD transcription. Mol Microbiol **24**: 1275-1284.

Evans K, Adewoye L and Poole K (2001). MexR repressor of the mexAB-oprM multidrug efflux operon of Pseudomonas aeruginosa: identification of MexR binding sites in the mexA-mexR intergenic region. J Bacteriol **183**: 807-812.

Firoved AM, Boucher JC and Deretic V (2002). Global genomic analysis of AlgU (sigma(E))-dependent promoters (sigmulon) in Pseudomonas aeruginosa and implications for inflammatory processes in cystic fibrosis. J Bacteriol **184**: 1057-1064.

Fujita M, Amemura A and Aramaki H (1998). Transcription of the groESL operon in Pseudomonas aeruginosa PAO1. FEMS Microbiol Lett **163**: 237-242.

Galimand M, Gamper M, Zimmermann A and Haas D (1991). Positive FNR-like control of anaerobic arginine degradation and nitrate respiration in Pseudomonas aeruginosa. J Bacteriol **173**: 1598-1606.

Gamper M, Zimmermann A and Haas D (1991). Anaerobic regulation of transcription initiation in the arcDABC operon of Pseudomonas aeruginosa. J Bacteriol **173**: 4742-4750.

Goranson J, Hovey AK and Frank DW (1997). Functional analysis of exsC and exsB in regulation of exoenzyme S production by Pseudomonas aeruginosa. J Bacteriol **179**: 1646-1654.

Hassett DJ, Howell ML, Ochsner UA, Vasil ML, Johnson Z and Dean GE (1997). An operon containing fumC and sodA encoding fumarase C and manganese superoxide dismutase is controlled by the ferric uptake regulator in Pseudomonas aeruginosa: fur mutants produce elevated alginate levels. J Bacteriol **179**: 1452-1459.

Hovey AK and Frank DW (1995). Analyses of the DNA-binding and transcriptional activation properties of ExsA, the transcriptional activator of the Pseudomonas aeruginosa exoenzyme S regulon. J Bacteriol **177**: 4427-4436.

Hudson JM and Fried MG (1990). Co-operative interactions between the catabolite gene activator protein and the lac repressor at the lactose promoter. J Mol Biol **214**: 381-396.

Hunt TA, Peng WT, Loubens I and Storey DG (2002). The Pseudomonas aeruginosa alternative sigma factor PvdS controls exotoxin A expression and is expressed in lung infections associated with cystic fibrosis. Microbiology **148**: 3183-3193.

Jin S, Ishimoto KS and Lory S (1994). PilR, a transcriptional regulator of piliation in Pseudomonas aeruginosa, binds to a cis-acting sequence upstream of the pilin gene promoter. Mol Microbiol **14**: 1049-1057.

Jyot J, Dasgupta N and Ramphal R (2002). FleQ, the major flagellar gene regulator in Pseudomonas aeruginosa, binds to enhancer sites located either upstream or atypically downstream of the RpoN binding site. J Bacteriol **184**: 5251-5260.

Kato J and Chakrabarty AM (1991). Purification of the regulatory protein AlgR1 and its binding in the far upstream region of the algD promoter in Pseudomonas aeruginosa. Proc Natl Acad Sci U S A **88**: 1760-1764.

Kohler T, Epp SF, Curty LK and Pechere JC (1999). Characterization of MexT, the regulator of the MexE-MexF-OprN multidrug efflux system of Pseudomonas aeruginosa. J Bacteriol **181**: 6300-6305.

Kojic M, Jovcic B, Vindigni A, Odreman F and Venturi V (2005). Novel target genes of PsrA transcriptional regulator of Pseudomonas aeruginosa. FEMS Microbiol Lett **246**: 175-181.

Krieger R, Rompf A, Schobert M and Jahn D (2002). The Pseudomonas aeruginosa hemA promoter is regulated by Anr, Dnr, NarL and Integration Host Factor. Mol Genet Genomics **267**: 409-417.

Kukavica-Ibrulj I, Sanschagrin F, Peterson A, Whiteley M, Boyle B, Mackay J and Levesque RC (2008). Functional genomics of PycR, a LysR family transcriptional regulator essential for maintenance of Pseudomonas aeruginosa in the rat lung. Microbiology **154**: 2106-2118.

Lee JH, Lequette Y and Greenberg EP (2006). Activity of purified QscR, a Pseudomonas aeruginosa orphan quorum-sensing transcription factor. Mol Microbiol **59**: 602-609.

Lu CD and Abdelal AT (2001). The gdhB gene of Pseudomonas aeruginosa encodes an arginine-inducible NAD(+)-dependent glutamate dehydrogenase which is subject to allosteric regulation. J Bacteriol **183**: 490-499.

Lu CD, Winteler H, Abdelal A and Haas D (1999). The ArgR regulatory protein, a helper to the anaerobic regulator ANR during transcriptional activation of the arcD promoter in Pseudomonas aeruginosa. J Bacteriol **181**: 2459-2464.

Lu CD, Yang Z and Li W (2004). Transcriptome analysis of the ArgR regulon in Pseudomonas aeruginosa. J Bacteriol **186**: 3855-3861.

Matsui H, Sano Y, Ishihara H and Shinomiya T (1993). Regulation of pyocin genes in Pseudomonas aeruginosa by positive (prtN) and negative (prtR) regulatory genes. J Bacteriol **175**: 1257-1263.

Michel L, Gonzalez N, Jagdeep S, Nguyen-Ngoc T and Reimmann C (2005). PchR-box recognition by the AraC-type regulator PchR of Pseudomonas aeruginosa requires the siderophore pyochelin as an effector. Mol Microbiol **58**: 495-509.

Miyazaki H, Kato H, Nakazawa T and Tsuda M (1995). A positive regulatory gene, pvdS, for expression of pyoverdin biosynthetic genes in Pseudomonas aeruginosa PAO. Mol Gen Genet **248**: 17-24.

Mohr CD, Hibler NS and Deretic V (1991). AlgR, a response regulator controlling mucoidy in Pseudomonas aeruginosa, binds to the FUS sites of the algD promoter located unusually far upstream from the mRNA start site. J Bacteriol **173**: 5136-5143.

Nakada Y, Jiang Y, Nishijyo T, Itoh Y and Lu CD (2001). Molecular characterization and regulation of the aguBA operon, responsible for agmatine utilization in Pseudomonas aeruginosa PAO1. J Bacteriol **183**: 6517-6524.

Nishijyo T, Park SM, Lu CD, Itoh Y and Abdelal AT (1998). Molecular characterization and regulation of an operon encoding a system for transport of arginine and ornithine and the ArgR regulatory protein in Pseudomonas aeruginosa. J Bacteriol **180**: 5559-5566.

Ochs MM, Lu CD, Hancock RE and Abdelal AT (1999). Amino acid-mediated induction of the basic amino acid-specific outer membrane porin OprD from Pseudomonas aeruginosa. J Bacteriol **181**: 5426-5432.

Ochsner UA, Johnson Z and Vasil ML (2000). Genetics and regulation of two distinct haem-uptake systems, phu and has, in Pseudomonas aeruginosa. Microbiology **146 ( Pt 1)**: 185-198.

Ochsner UA, Vasil AI and Vasil ML (1995). Role of the ferric uptake regulator of Pseudomonas aeruginosa in the regulation of siderophores and exotoxin A expression: purification and activity on iron-regulated promoters. J Bacteriol **177**: 7194-7201.

Ochsner UA and Vasil ML (1996). Gene repression by the ferric uptake regulator in Pseudomonas aeruginosa: cycle selection of iron-regulated genes. Proc Natl Acad Sci U S A **93**: 4409-4414.

Ochsner UA, Wilderman PJ, Vasil AI and Vasil ML (2002). GeneChip expression analysis of the iron starvation response in Pseudomonas aeruginosa: identification of novel pyoverdine biosynthesis genes. Mol Microbiol **45**: 1277-1287.

Park SM, Lu CD and Abdelal AT (1997). Purification and characterization of an arginine regulatory protein, ArgR, from Pseudomonas aeruginosa and its interactions with the control regions for the car, argF, and aru operons. J Bacteriol **179**: 5309-5317.

Pesci EC, Pearson JP, Seed PC and Iglewski BH (1997). Regulation of las and rhl quorum sensing in Pseudomonas aeruginosa. J Bacteriol **179**: 3127-3132.

Pessi G and Haas D (2000). Transcriptional control of the hydrogen cyanide biosynthetic genes hcnABC by the anaerobic regulator ANR and the quorum-sensing regulators LasR and RhlR in Pseudomonas aeruginosa. J Bacteriol **182**: 6940-6949.

Rampioni G, Bertani I, Zennaro E, Polticelli F, Venturi V and Leoni L (2006). The quorum-sensing negative regulator RsaL of Pseudomonas aeruginosa binds to the lasI promoter. J Bacteriol **188**: 815-819.

Ramsey DM, Baynham PJ and Wozniak DJ (2005). Binding of Pseudomonas aeruginosa AlgZ to sites upstream of the algZ promoter leads to repression of transcription. J Bacteriol **187**: 4430-4443.

Rompf A, Hungerer C, Hoffmann T, Lindenmeyer M, Romling U, Gross U, Doss MO, Arai H, Igarashi Y and Jahn D (1998). Regulation of Pseudomonas aeruginosa hemF and hemN by the dual action of the redox response regulators Anr and Dnr. Mol Microbiol **29**: 985-997.

Rust L, Pesci EC and Iglewski BH (1996). Analysis of the Pseudomonas aeruginosa elastase (lasB) regulatory region. J Bacteriol **178**: 1134-1140.

Schuster M, Hawkins AC, Harwood CS and Greenberg EP (2004). The Pseudomonas aeruginosa RpoS regulon and its relationship to quorum sensing. Mol Microbiol **51**: 973-985.

Schweizer HP, Jump R and Po C (1997). Structure and gene-polypeptide relationships of the region encoding glycerol diffusion facilitator (glpF) and glycerol kinase (glpK) of Pseudomonas aeruginosa. Microbiology **143 ( Pt 4)**: 1287-1297.

Schweizer HP and Po C (1996). Regulation of glycerol metabolism in Pseudomonas aeruginosa: characterization of the glpR repressor gene. J Bacteriol **178**: 5215-5221.

Shiba T, Ishiguro K, Takemoto N, Koibuchi H and Sugimoto K (1995). Purification and characterization of the Pseudomonas aeruginosa NfxB protein, the negative regulator of the nfxB gene. J Bacteriol **177**: 5872-5877.

Song J and Jensen RA (1996). PhhR, a divergently transcribed activator of the phenylalanine hydroxylase gene cluster of Pseudomonas aeruginosa. Mol Microbiol **22**: 497-507.

Suh SJ, Runyen-Janecky LJ, Maleniak TC, Hager P, MacGregor CH, Zielinski-Mozny NA, Phibbs PV, Jr. and West SE (2002). Effect of vfr mutation on global gene expression and catabolite repression control of Pseudomonas aeruginosa. Microbiology **148**: 1561-1569.

Swanson BL, Colmer JA and Hamood AN (1999). The Pseudomonas aeruginosa exotoxin A regulatory gene, ptxS: evidence for negative autoregulation. J Bacteriol **181**: 4890-4895.

Vijgenboom E, Busch JE and Canters GW (1997). In vivo studies disprove an obligatory role of azurin in denitrification in Pseudomonas aeruginosa and show that azu expression is under control of rpoS and ANR. Microbiology **143 ( Pt 9)**: 2853-2863.

Westfall LW, Luna AM, San Francisco M, Diggle SP, Worrall KE, Williams P, Camara M and Hamood AN (2004). The Pseudomonas aeruginosa global regulator MvaT specifically binds to the ptxS upstream region and enhances ptxS expression. Microbiology **150**: 3797-3806.

Whiteley M and Greenberg EP (2001). Promoter specificity elements in Pseudomonas aeruginosa quorum-sensing-controlled genes. J Bacteriol **183**: 5529-5534.

Whiteley M, Lee KM and Greenberg EP (1999). Identification of genes controlled by quorum sensing in Pseudomonas aeruginosa. Proc Natl Acad Sci U S A **96**: 13904-13909.

Wilson MJ, McMorran BJ and Lamont IL (2001). Analysis of promoters recognized by PvdS, an extracytoplasmic-function sigma factor protein from Pseudomonas aeruginosa. J Bacteriol **183**: 2151-2155.

Winteler HV and Haas D (1996). The homologous regulators ANR of Pseudomonas aeruginosa and FNR of Escherichia coli have overlapping but distinct specificities for anaerobically inducible promoters. Microbiology **142 ( Pt 3)**: 685-693.

Winzer K, Falconer C, Garber NC, Diggle SP, Camara M and Williams P (2000). The Pseudomonas aeruginosa lectins PA-IL and PA-IIL are controlled by quorum sensing and by RpoS. J Bacteriol **182**: 6401-6411.

Wozniak DJ and Ohman DE (1993). Involvement of the alginate algT gene and integration host factor in the regulation of the Pseudomonas aeruginosa algB gene. J Bacteriol **175**: 4145-4153.

Wozniak DJ and Ohman DE (1994). Transcriptional analysis of the Pseudomonas aeruginosa genes algR, algB, and algD reveals a hierarchy of alginate gene expression which is modulated by algT. J Bacteriol **176**: 6007-6014.

Yahr TL, Goranson J and Frank DW (1996). Exoenzyme S of Pseudomonas aeruginosa is secreted by a type III pathway. Mol Microbiol **22**: 991-1003.

Yahr TL, Hovey AK, Kulich SM and Frank DW (1995). Transcriptional analysis of the Pseudomonas aeruginosa exoenzyme S structural gene. J Bacteriol **177**: 1169-1178.

Yamano Y, Nishikawa T and Komatsu Y (1998). Involvement of the RpoN protein in the transcription of the oprE gene in Pseudomonas aeruginosa. FEMS Microbiol Lett **162**: 31-37.

Yang H, Matewish M, Loubens I, Storey DG, Lam JS and Jin S (2000). migA, a quorum-responsive gene of Pseudomonas aeruginosa, is highly expressed in the cystic fibrosis lung environment and modifies low-molecular-mass lipopolysaccharide. Microbiology **146 ( Pt 10)**: 2509-2519.

Yuan ZC, Zaheer R and Finan TM (2005). Phosphate limitation induces catalase expression in Sinorhizobium meliloti, Pseudomonas aeruginosa and Agrobacterium tumefaciens. Mol Microbiol **58**: 877-894.