

Figure S5A: Alignment of Ku80a, Ku80b and Ku80c proteins from *P. tetraurelia*

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|--------------------------------------|-----|---|
| Pt-Ku80c | 1 | MSGKEATLILLDVGASMYGOYQQGGSKKLSRLELAVDCLGLMIQQKIFNYKNHEVGLILF |
| Pt-Ku80a | 1 | MAGKEATLVLLDVGASMYEPYKQAQGKKITRLELAVDCIGMMIQKIFNYKNHEVGLVLF |
| Pt-Ku80b | 1 | MAGKEATLVLLDVGASMYEPYKQAQGNITRLELAVDCIGMMIQKIFNYKNHEVGLVLF |
| ----- α/β domain ----- | | |
| Pt-Ku80c | 61 | GTEEAPDGKTLIYIQDLSIPDLDFFRNISLDPNHVGGQVGGDIFDALDKAVHALDDHAKT |
| Pt-Ku80a | 61 | GTEDAEDGNTFYIQTLLSSPDLEFYRNLTLPNHDI PKIIGGDIFDALDKSVSTLDEYVKT |
| Pt-Ku80b | 61 | GTEEAEDGNTFYIQVMSPDLEFYRNLTLPNHDPKIKGGDIFDALDKAVSTLDEYVKA |
| ----- | | |
| Pt-Ku80c | 121 | KKMEKKIFILTAGCGQTDYSEKQITTKLIKMIKVDVKINFIALDFMNDYNGDMDDPEKPE |
| Pt-Ku80a | 121 | KKMDKKIFVLTAGFGQTEYNEKKIAKLIKMIKVDVKINFIALDFMNEYDAELDDPSKPE |
| Pt-Ku80b | 121 | KKMEKKIFVLTAGFGQTDYNEKKIGKLIKMIKVDVKINFIAMDFMNEYDVELDDPTKPE |
| ----- | | |
| Pt-Ku80c | 181 | EFELNNRMLTASYQCQEQSINSRYVFLMVQELRNMRIFPANVAFELYSQFHTRSLOAR |
| Pt-Ku80a | 181 | NQETLNDRMLNAVYESQEQSINSRLVYVMVQELRSHMRIFPANIAFELYSQFHTKMQMAR |
| Pt-Ku80b | 181 | NQATLNDRMLNAVYQHQEQSINSRLIYQMVQELRNHMRIFPANIAFELYSQFHTKMQMAR |
| ----- | | |
| Pt-Ku80c | 241 | ASFRGDFQINDEISVQVLIYKRCFEERLPTLRKHSTLGEFQTDTNKNHVNRNDLIYYNPED |
| Pt-Ku80a | 241 | ASFRGDFQINDETSISVLVYKRCTEEKLP SLKKHSATGEFSSEPTRNVVRNDTIHYNPED |
| Pt-Ku80b | 241 | ASFRGDFQINDETSIQVLIYKRC AEDRLPSLKKHSAIGEYSSEPTRNIVRNDSIHYNPED |
| ----- β barrel ----- | | |
| Pt-Ku80c | 301 | PNMTPIEKDNIIRGYQYGRNLPVDQIMEDKMKYQCPRQFQLLGFVDRSHIPRYYYTSTV |
| Pt-Ku80a | 301 | PNMTPIERENIKGYLYGRSLIPVDSIMEDKMKYQCVRSFQLLGFVDKSQLPRHYFMSSV |
| Pt-Ku80b | 301 | PNMTPIERENIKGYQYGRNLPVDSLMEKMKYQCNRSFQLLGFVRSQIPRHYFIFNV |
| ----- | | |
| Pt-Ku80c | 361 | DMVIAVENOKQOKALAAVIALIATRKVALARFVGREKTAPKLIMLLPHKSKNSQCFWMI |
| Pt-Ku80a | 361 | DMVAIDCEKAKKSLSSLI IALIAATKKAIAARFVGREKSSPKMVVLLPHKSKSYQCFWMI |
| Pt-Ku80b | 361 | DMVIAIDCEKARKSLSALI IALIAATKKAIAARFVGRQKSSPKLMLLPHKSKSYQCFWMI |
| ----- | | |
| Pt-Ku80c | 421 | SLPTIEDIRHFQFAALKRSTPPQQMAVSAMIDCMDLEKMPTEGQFEELLKMKYVANPTR |
| Pt-Ku80a | 421 | ALPTSEDIRHFQFAALRKSTPHQQI IAVASLIDKMDLEALPNESGEPEELLKMKYIANPTR |
| Pt-Ku80b | 421 | SLPTSEDIRHFQFSTLRKSTPNQQSAVATLIDKMNLETI PNESGEPEELLKMKYIANPTR |
| ----- | | |
| Pt-Ku80c | 481 | QYFQQVVMHKAITRSDVLPPI SPLILEYLHPEKRVYDYAKEALQKVKA AFKFKINEIKKQ |
| Pt-Ku80a | 481 | QYFQQVVMHKAITRTDVIPPISPLILEYLHPEQRVYNYAQDAIQRVKNAFKFKVNEIKKP |
| Pt-Ku80b | 481 | QYFQQVVMHKAITRTDVIPPISPLILDYHLPERRVYNYAQDAIQRVKNAFKFKVNDIKKP |
| ----- | | |
| Pt-Ku80c | 541 | GDKKVFWKQLFEDQST. .EQIQQQVEDEVVEINQEEEEEMVNMFAKQKLGFNDDIVKEIGT |
| Pt-Ku80a | 541 | QDKKVFWKQLFDEQTTQQQQAQQQIEEEVVEINREEEEMVNMFAKQKLGFNDDIIQEIGS |
| Pt-Ku80b | 541 | QDKKVFWKQLFDEQTA. QQQVPEQIEEIVEINREEEEMVNMFAKQKFGFNDDIIQEIGS |
| ----- C-ter (DNA-PKcs binding) ----- | | |
| Pt-Ku80c | 599 | VDPISDFRKMITEKRVLDLVDIALQQIQKVI IQFVDQSLKGSFYPKALECLKEMRKACITE |
| Pt-Ku80a | 601 | VDPISDFKKMITEKRVLDLVDLSALQQIQKVI IGLVDQSVKGSFFPKALECLKEMRRACISE |
| Pt-Ku80b | 600 | VDPISDFKKMITEKRVLDLVDLSALQQIQKVIN ALVDQSVKGSFFPKALECLKEMRKACISE |
| ----- | | |
| Pt-Ku80c | 659 | DEAPVFNKYLHVLKEKYSQLVFWAQIVQQGITLISNIENQKSHVSVDEAQEFLNKEDISH |
| Pt-Ku80a | 661 | DEAPVFNKFLFVLKDKYNQSI FWAQIVQQGITLISNIENQKSGVTAAEAQDFLNKEDNKH |
| Pt-Ku80b | 660 | DEAPVFNKFLFVLKDKYNQQL FWAQIVQQGITLISDIENHKS SVTAAEAQDFLNKEDNKH |

Pt-Ku80c 719 KQLVDQLQHEEEDLLAETD
Pt-Ku80a 721 QQMVDQLQHEEEDLLADIE
Pt-Ku80b 720 QQMVDQLQNEEEDLLADIE

Figure S5B: Alignment of Ku70a and Ku70b proteins from *P. tetraurelia*

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PtKu70a 1 MDFEEEHAGGDDVVEEIQDGEDIFGEDADISVHDSGSKKDAVIFLVDCKKALFDMDDQDGG
PtKu70b 1 MDFEEEHAGGDDVVEEIQDGEDIFGEDADISVHDSGSKKDAVIFLVDCKKALFDMDDQDGG

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PtKu70a 61 TVFSKILSAFSSFMKAKIISPDDRIGMIFYNTKSTNNQLKFNNITEIYKLDGSPADI IK
PtKu70b 61 TVFSKILSAFSSFMKAKIISPDDRIGMIFYNTKSTNNQLKFNNITEIYKLDGSPADI IK

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PtKu70a 121 NCLKIEQNFEKDYQLGNNAHFHECLWLCNHEFKELDKNKFNMRIFLFTPDDL PYFKDINA
PtKu70b 121 NCLKIEQNFEKDYQLGNNAHFHECLWLCNHEFKELDKNKFNMRIFLFTPDDL PYFKDVNA

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PtKu70a 181 RSSALKYAKQLKDADVQIELFPLPSQNEFKIARFYGEIITVDLDEVNNAVLDTSTKIMDL
PtKu70b 181 RSSALKYAKQLKDADVQIELFPLPSQNEFKIARFYGEIITVDLDEVNNAVLDTSTKIMDL

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PtKu70a 241 HQR IKQKEFKKRALNRLIMDIDDIKIGLKIYCLV NKAKKPYGKPLDRRYNQQLKKAQFI
PtKu70b 241 HQR IKQKEFKKRALNRLIMDIDDIKIGLKIYCLV NKAKKPYGKPLDRRYNQQLKKAQFI

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PtKu70a 301 DEETGQALFPQQISTHLILGNEKIAIPKEYMAKIKGFEPGMTLIGFKSSSALKDYHNYR
PtKu70b 301 DEETGQALFPQQISTHLILGNEKIAIPKEYMAKIKGFEPGMTLIGFKSSSALKDYHNYR

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PtKu70a 361 ASYFLYPDDEHVN GSSQFFDALIQQMILKEKIGIVRLVPKQGSQVRF CALLPQAEQYDEN
PtKu70b 361 ASYFLYPDDEHVN GSSQFFDALIQQMILKERIGIVRLVPKQGSQVRF CALLPQAEQYDEN

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PtKu70a 421 HFQTPPGLHLIFLPYADDIRGLSIVKQEGAEITRQTLNAAKILVNALTIQDFDCSNFEDP
PtKu70b 421 HFQTPPGLHLIFLPYADDIRGLSSVKQEGAEISRQTLNAAKILVNALTIQDFDCSNFEDP

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PtKu70a 481 SIQKFYTYLQGLALQE QNIEEPEDLLQPDFKGMEKYRDIVNLFMSNVSLECSNMPSRSKG
PtKu70b 481 SIQKFYTYLQGLALQE QNIEEPEDLLQPDFKGMEKYRDIVNLFMSNVSLECSNMPSRSKG

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PtKu70a 541 QGGGRGRGRGRGRGKQEESE SDDCSKVKGRGRGSTQKQKI.EEDDSLEGE EIIYQPVKVRG
PtKu70b 541 QGGGRGRGRGRGRGKQEESE SDDCHKVKGRGRGSTSKQKVEE EEDDSLEGE EIIYQPIKVRG

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PtKu70a 600 RGR
PtKu70b 601 RGR

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