Additional file 2:
Alignment of *macpiwi* to the different *piwi* genes characterized in the planarian flatworms
Schmidtea mediterranea (Smedwi1 DQ186985, Smedwi2 DQ186986) and *Dugesia japonica* (DjPiwi1 AJ865376).

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                *          20         *          40         *          60         *          80         *         100
Macpiwi : MSQQPKGRGRARGRSGPRPEEVSSGASFAPAPAAAPAPPVAAARPAPPPGLSAQAGVAPSGDQQNTGRGVGRAVERGGAAQQAGDPGQLSERMAGLRVG : 100
Smedwi1 : ------------------------------------------------------------------------------------MDSTNVTTD        :   9
Smedwi2 : ---------------------------------------------------------------------------MEEIPVKVARLEANGSET        :  18
DjPiwi1 : ------------------------------------------------------------------------------MEIELIRKNLD          :  11


                *         120         *         140         *         160         *         180         *         200
Macpiwi : GEASGDRGGGLGRKLLRFQLANVRGEGAAGKCSSGAPQQVMTTVRINTEDKWCAYQLAADGRPMLGAKPGREKLLN----DAQQVGKPKVVDGGGLGVKQ : 197
Smedwi1 : PNLRPPRGGGLGRRCGAGEA-DGPDTVTDKTGKDGKVVSGKSKYAN NIKVEGPFYGVTDVVMENKSIRTGTGHGLLAYANSKNNGGD--PGEDGCRLLGTS : 106
Smedwi2 : RGKMGNRGGGGRGTGRGVRGN-LGPADITEKTGNIGRTVGGQSNTFKGSVLRSEKFMGVIYDTGSQVGLSPGVKGQFIVRVCQENKLGGARGEDGSLLGTSE : 117
DjPiwi1 : GIRIEPGGGGLGKRPDGVGD-LGPNETKGRTGNGKVPGGQSNTTGSVNKSEKFYHGIVDTTGSKMGLSPGLRGQILVRICKEYNLDGSGGEDGCRLLGTSD : 110


                *         220         *         240         *         260         *         280         *         300
Macpiwi : PLAPAEGVKFAASIKSWSGRVAIPGGGVIEKNGPQWLHLHLMGVGKTGSHLNMQMVGRNFYYPDQATGLPQHRMEVVPGGAMAIKPSDGPLMLHVDVSHK : 297
Smedwi1 : KGHSDGTENLVIKD----VKISIRGLTGFGKNSGEYYQMINIVFGNTGFMGGVKGRGPGICGGCGIRE--GRSGFKMDNGFRIGGCYTGILTTRGTCNN   : 201
Smedwi2 : KGHGESGIQEFSHDE---KKMTLRGLVSGLGPETEEYYQHINVLMGNLQVHLGGGRGCKGYGFSPGITGDEVPRNSGSITGFITNSGRGVGGFGVLQGSGTK : 214
DjPiwi1 : NGTEGSGIKEFTIDE---KKVSLRGLVSGFFSDGTEEYYQHINVGLNAGLQIIMGGGRGGRGGLGGSGNSNGDNVVKNIGGITGFGITNNGRGVGCGFGVLQGTGTR : 207


                *         320         *         340         *         360         *         380         *         400
Macpiwi : IIHMSGVDDVMYDMYHRNPGN------FQAAATGLALGEQIVLGPHMNNKTYRIDAGRWDKRVTETFPRYNKSTRQSERISLLGRAQTYNGALSDSEGHILM : 392
Smedwi1 : KNGTASTLLTLERINRVLMGDN SVSVGRDGQDGDLLGNDHTGKNMNTYRISHGKHD--------VND RVQLGDKKESGLLTVFGDGYNLMGKNDFQPFVI : 294
Smedwi2 : PTGELITTLLTLERINRVLMGDSGKRAGRGPS DGLLGNDHTGKNMNTYRISHEGKEN----VDBKFEMGGRTSGYAGYFGRGYNGRGTGGDGQFVL : 307
DjPiwi1 : PNGQLITTLLTLERINRVLMGDSGLVTGNGDNGDLLGHDHTGKNMNRTYRISHKGENN-----INETFEMVGRTLSGYAGYFGRGYNGITTEQGPFGL : 300


                *         420         *         440         *         460         *         480         *         500
Macpiwi : SKPRGRDLPPTK-----------GGPRGQAENVLLGPEVGGMTGLTGEMRADRGGDGGATFTRIDGSTGCCKLVKGASTMAQNREQRVLGEFGRAV : 479
Smedwi1 : SGVTPSMVGPKG---------TNNGPGGRTGTGQSGSTPGFGGVLGGGSDSPGTINGKGNLGTGVLKPGDGRDDGGRDFCGKTG-AGKSKDYMKSGGHCH : 386
Smedwi2 : TRVKSPMRGERKGRDEGGVEKEKGKGAPGEGKMTGNIPGEGCFLGGGSGDQGKGMDGKNLGCVLKBPDGRERDGDIPAYCNGIKNSDAATGMCNKGQGRGI : 407
DjPiwi1 : TRVKGIARGDKPGE--------HNGNGAHEDMGLTNGTGEGCFLGGGSDQGKGSIDGKNLGCVLKGCPDRERDGDGIPSGFCDGIKTNNNSQGMSNNGQGRGI : 393


                *         520         *         540         *         560         *         580         *         600
Macpiwi : APNAVGGATARGLAETGQHTKPIRVDPRERADGDNALKGNGMFQPVNCKNWIFVYSGQRDEQAAADFCQRLSRASQSGGHSFGGEPYGLAVAQDRDQLWVKTI : 579
Smedwi1 : EEQDIITRGRGRDADVGIFGNEVKENTGTGDTMKDFCEIKGDVRGTAGRFGGLVVDBGYNGFPIEGVVRGIGRATINYTMDSISSCGRSGEVDADTGF   : 485
Smedwi2 : DNRGLEIEGRRDTDGCVGGSGRIMEGMG-DMKFGRVQGDIKRDRKGEKID VIVDGRIDFQYKGRHMNGVEQGLRBNMGIDARVGRGKNTGFSGNCNGA   : 506
DjPiwi1 : DNTGLIIEGRRTGPHCGVGGGQPGIMEGKGDMKFGKVQGNVQKGVKGEIDGVIVDGRDSQYGGMLNGVEYGIKQLMGFDAKIGFGLVGSALDGVERSGNGV   : 492


                *         620         *         640         *         660         *         680         *         700
Macpiwi : EENIDQGLDLVFCLLGSNKKQGYDSIRKLCYVNKPVPSGQCVLGK--IIRGPAKVMSGATKVALQGSCHLGDVALAVVSGPLGRTHIVCGDTHGDRQSVGSV : 677
Smedwi1 : IG---VSKVHMGALVTGHPDI---VGYAKVKNGTMTGTGCLLGQCVTGQRNGGNDGPDTGKTGADRGSVMCQVSGSGYCTDVGGINLKGAQGTHIVCGDTHGSKGGPSV : 580
Smedwi2 : AGSGSGGCAKIGALVTGVPDI---HVYAKVKSGTMTGCLLGQCVTGRNGTNRNDKRTRKVGSSGRTVMQGIARGGFGIDFGTVEGIRGPPTHIVCGDTHGNRSSGFSI : 603
DjPiwi1 : MGSGSGCAKIGALVTGVPDI---RVYAKVKSGTMSTGLLGQCVTGRNGTNRNDKRIYKGIRTGVPGGMNGVEQGGCGTGDTHGNKGHRGTHIVCGDTHGDRGGPSV : 589


                *         720         *         740         *         760         *         780         *         800
Macpiwi : CGIVFSGNEGFGRQYKGYSPIVKGCGRABLEGHPGLEVNGNGALGRGREKNGDGPFGLIGRDGVGDGMGKEVKWGNSGLLQGLGSLSKTGGERMSSLGFKAIGVK : 777
Smedwi1 : QASVFSTGAKPGSGVGGTVVN-SGCGHGTGHENGGKNGPLTALTTGQNKFNTGPGLLIGRDGVGDGPDGGTGRGPGDGVMKGHGYRTGKRN--QTLGQIYVWV   : 677
Smedwi2 : QASVFSTGGTGFGYGSGGVVNSGCGGQGIGETGSGKNGPLNALGEDKKRYDIGGPGRGVFGRDGVGDGTGGTGGTGLGPLIGNGRGNGFPVGQIIIVVV : 703
DjPiwi1 : HASVFSTGTGTFGSGVGKGGQANGSGCGGGSGHGTGFTGKGFTGKRIYKLGPPGHGVRDGVGDGTGTGGTDGDGTGFGIGGPLIGNGKENGCGVQQIIIVI   : 784


                *         820         *         840         *         860         *         880         *         900
Macpiwi : RLVSSRMFRQGGSQLPNTGAPGTGLGDDVGTHPNGVDFGLVSGYVNQGTGVPHGTAMIIGDVNDAGIIG---------RGDQVGQLTYKLTHLYFNMPGTIRVPAP : 869
Smedwi1 : KKNISVGEGRDGCA---MDNPGTGVGDGGHVGRPNFGHFGLVSGKGTGRGSAPTNYGNVLGDGKFTTNGGGTNNSGVGHQGTYSLTHLYFNMGCTIRVPFY : 774
Smedwi2 : KKRVGTGLGNPGGN----MDNPGTGVGDGHVRPNFGHFGLVSORTGRGTAPTPNYNNVMEDGRLLTGGS-TMDPMAGNNKGGVYTLTHLYFNMGCTIRVPVP : 799
DjPiwi1 : KRDIGTGLGNPGGN----MDPGTGVGDGEGHVKGPNFGHFGLVSGRVGPGTAPTPNYNVLEDGTRYQNGAG-IIKAITPNEGDGYGTYTLTHLYFNMGCTIRVPVB : 784


                *         920         *
Macpiwi : CHYAHRLAMTLVGQNLMEKP----SPQHGDRLPFLG : 899
Smedwi1 : THYAHRLAMLVGGTGPGVTGPATNDINRPLPFVL   : 808
Smedwi2 : VHYAHRLAMLVGKVGRGSNGVAINEININPLFVL   : 833
DjPiwi1 : VHYAHRLAMTLGVKGGSNGTALINEININPLFVL   : 818
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