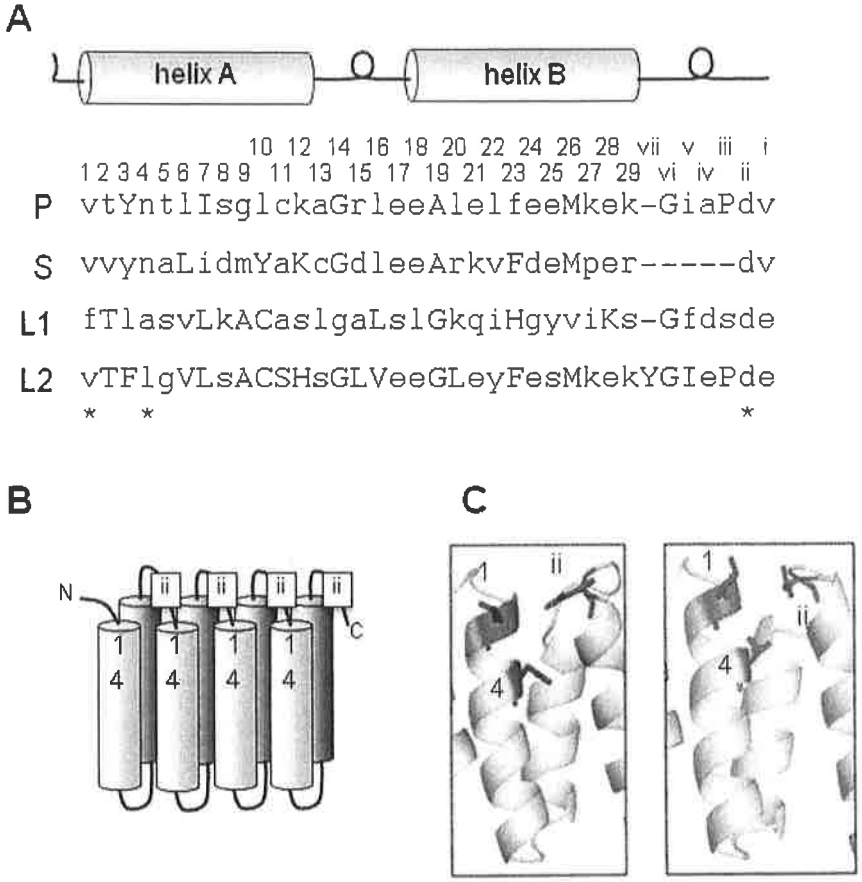
[Fig. 1]

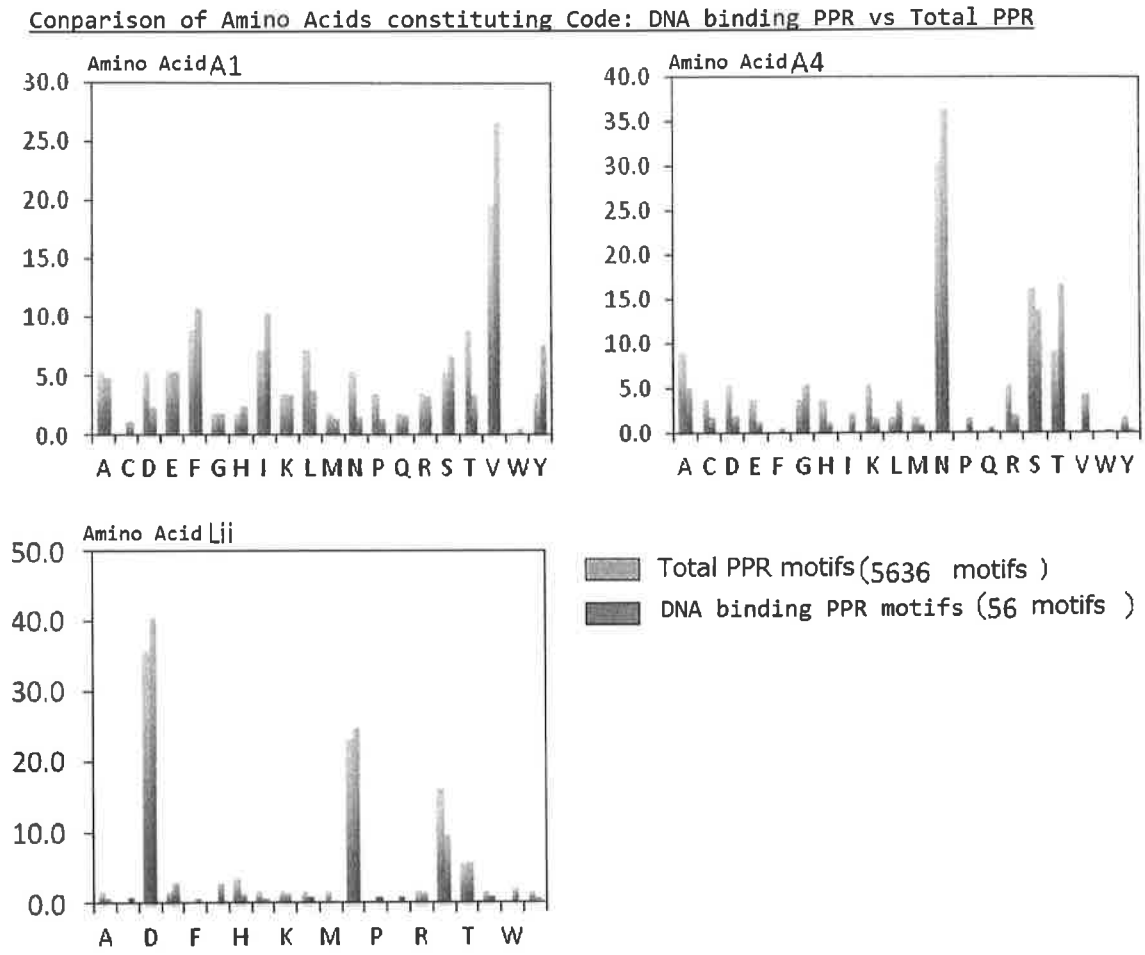


[Fig. 2]

PPR proteins that function in DNA metabolism

Name	Architecture	Assay
p63 (612 aa) (Wheat)	9 x PPR	DNA binding (gel shift assay) activation of in vitro transcription
pTac2 (862 aa) (Arabidopsis)	15 x PPR Smr	Loss of transcription in vivo (Run-On assay)
GUN1 (862 aa) (Arabidopsis)	11 x PPR Smr Poly-Thr	DNA binding (pull-down assay)
DG1 (798 aa) (Arabidopsis)	10 x PPR	Loss of transcription in vivo (Run-On assay)
GRP23 (913 aa) (Arabidopsis)	Leucine Zipper 11 x PPR WQQ	Embryonic lethal Interaction with pol2 large subunit via WQQ (Two hybrid, BiFC)

[Fig. 3]


Conparison of Amino Acids constituting Code: DNA binding PPR vs Total PPR
Amino Acid A1
30.0
25.0
20.0
15.0
10.0
5.0
0.0
A C D E F G H I K L M N P Q R S T V W Y
Amino Acid A4
40.0
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
A C D E F G H I K L M N P Q R S T V W Y
Amino Acid Lii
50.0
40.0
30.0
20.0
10.0
0.0
A D F H K M P R T W
Total PPR motifs (5636 motifs)
DNA binding PPR motifs (56 motifs)

[Fig. 4-1]

(A) The positions of the PPR motifs, and the positions of No. 1 A.A., No. 4 A.A., and No. "ii" (-2) A.A. for *Arabidopsis thaliana* p63 (SEQ ID NO: 1)

Motif No.	AA No.	Seqence	Amino Acid Insertion between PPR motifs
1	230-264	VLYRTLLANCVAAGNVKKSELVFNKMKDLGFPLSG	-
2	265-298	FTCDQMLLLHKRIDRKKIADVLLLMEKENIKPSL	-
3	299-333	LTYKILIDVKGATNDISGMEQILETMKDEGVELDF	-
4	334-368	QTQALTARHYSGAGLKDKAEKVLKEMEGESLEANR	-
5	369-399	RAFKDLLSIYASLGREDEVKRIWKICESKPY	F
6	401-435	EESLAAIQAFGKLNKVQEAEAIFEKIVKMDRRASS	-
7	436-470	STYSVLLRVYVDHKMLSKGKDLVKRMAESGCRIEA	-
8	471-505	TTWDALIKLYVEAGEVEKADSLLDKASKQSHTKLM	N
9	507-541	NSFMYIMDEYSKRGDVHNTEKIFLKMREAGYTSRL	-

(B) The positions of the PPR motifs, and the positions of No. 1 A.A., No. 4 A.A., and No. "ii" (-2) A.A. for the GUN1 protein of *Arabidopsis thaliana* (SEQ ID NO: 2)

Motif No.	AA No.	Seqence	Amino Acid Insertion between PPR motifs
1	234-268	KLASAMISTLGRYGKVTIAKRIFETAFAGGYGNTV	-
2	269-303	YAFSALISAYGRSGLHEEAISVFNSMKEYGLRPNL	-
3	304-339	VTYNAVIDACGKGGMEFKQVAKFFDEMQRNGVQPDR	-
4	340-374	ITFNSLLAVCSRGGLWEAARNLFDEMTNRRIEQDV	-
5	375-409	FSYNTLLDAICKGGQMDLAFEILAQMPVKRIMPNV	-
6	410-444	VSYSTVIDGFAKAGRFDEALNLFGEMRYLGIALDR	-
7	445-479	VSYNTLLSIYTKVGRSEEALDILREMASVGIKKDV	-
8	480-514	VTYNALLGGYGKQGKYDEVKKVFTEMKREHVLPNL	-
9	515-549	LTYSTLIDGYSKGGLYKEAMEIFREFKSAGLRADV	-
10	550-584	VLYSALIDALCKNGLVGSAVSLIDEMTKEGISPNV	-
11	585-621	VTYNSIIDAFGRSATMDRSADYSNGGSLPFSSSALSA	-

[Fig. 4-2]

(C) The positions of the PPR motifs, and the positions of No. 1 A.A., No. 4 A.A., and No. "ii" (-2) A.A. for pTac2 of *Arabidopsis thaliana* (SEQ ID NO: 3)

Motif No.	AA No.	Seqence	Amino Acid Insertion between PPR motifs
1	106-141	NDFALVFKEFAGRGDWQRSLRLFKYMQRQIWCKPNE	-
2	142-176	HIYTIMISLLGREGLLDKCLEVFDEMPSQGVSRSV	-
3	177-211	FSYTALINAYGRNGRYETSLELLDRMKNEKISPSI	-
4	212-247	LTYNTVINACARGGLDWEGLLGLFAEMRHEGIQPDI	-
5	248-282	VTYNTLLSACAIRGLGDEAEMVFRTMNDGGIVPDL	-
6	283-317	TTYSHLVETFGKLRRLEKVCDLLGEMASGGSLPDI	-
7	318-352	TSYNVLLEAYAKSGSIKEAMGVFHQMQAAGCTPNA	-
8	353-387	NTYSVLLNLFGQSGRYDDVRQLFLEMKSSNTDPDA	-
9	388-422	ATYNILIEVFGEGGYFKEVVTLFHDMVEENIEPDM	-
10	423-457	ETYEGIIFACGKGGLHEDARKILQYMTANDIVPSS	-
11	458-492	KAYTGVIEAFGQAALYEEALVAFNTMHEVGSNPSI	-
12	493-527	ETFHSLLYSFARGGLVKESEAILSRLVDSGIPRNR	-
13	528-562	DTFNAQIEAYKQGGKFEEAVKTYVDMEKSRCDPDE	-
14	563-597	RTLEAVLSVYSFARLVDECREQFEEMKASDILPSI	-
15	598-632	MCYCMMLAVYGKTERWDDVNELLEEMLSNRVSNIH	-

(D) The positions of the PPR motifs, and the positions of No. 1 A.A., No. 4 A.A., and No. "ii" (-2) A.A. for DG1 (SEQ ID NO: 4).

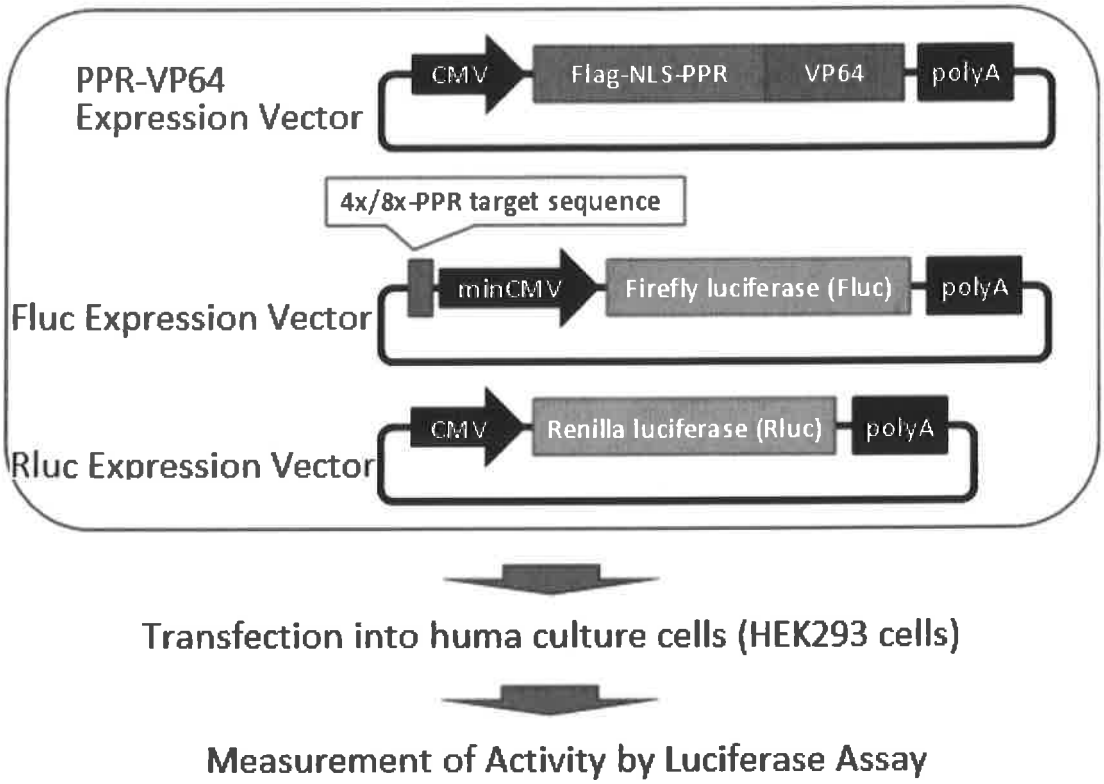
Motif No.	AA No.	Seqence	Amino Acid Insertion between PPR motifs
1	256-286	FVYTKLLSVLGFARRPQEALQIFNQMLGDRQ	LYPDM
2	292-326	AAYHCIAVTLGQAGLLKELLKVIERMRQKPTKLTK	NLRQKNWDPVLEPDL
3	342-376	VVYNAILNACVPTLQWKAVSWVFVELRKNGLRPNG	-
4	377-411	ATYGLAMEVMLESGKFDRVHDFFRKMKSSGEAPKA	-
5	412-446	ITYKVLVRALWREGKIEEAVEAVRDMEQKGVIGTG	-
6	447-482	SVYYELACCLCNNGRWCDAMLEVGRMKRLENCRPLE	-
7	483-513	ITFTGLIAASLNGGHVDDCMAIFQYMKDKCD	PNI
8	517-547	GTANMMLKVYGRNDMFSEAKELFEEIVSRKE	THLVPNE
9	555-589	YTYSFMLEASARSLQWEYFEHVYQTMVLSGYQMDQ	-

[Fig. 4-3]

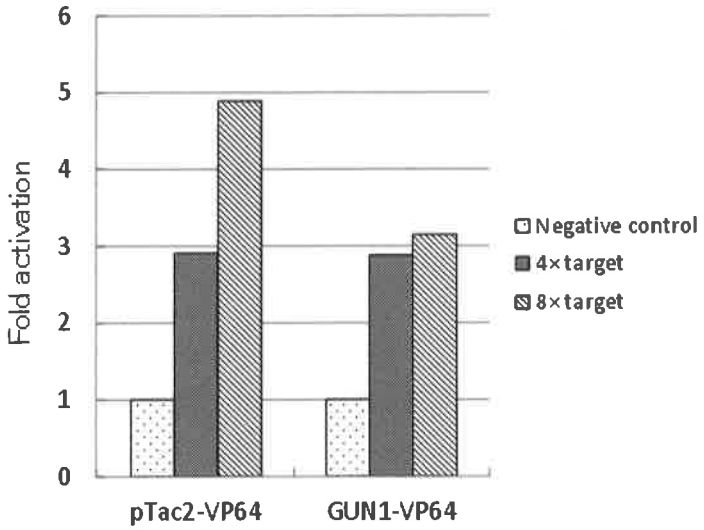
(E) The positions of the PPR motifs, and the positions of No. 1 A.A., No. 4 A.A., and No. "ii" (-2) A.A.for GRP23 of *Arabidopsis thaliana* (SEQ ID NO: 5)

Motif No.	AA No.	Seqence	Amino Acid Insertion between PPR motifs
1	181-216	FTCNAIIAAMYRAKRYSESISLFQYFFKQSNIVPNV	-
2	217-252	VSYNQIINAHCDEGNVDEALEVYRHILANAPFAPSS	-
3	253-287	VTYRHLTKGLVQAGRIGDAASLLREMLSKGQAADS	-
4	288-318	TVYNNLIRGYLDLGDFDKAVEFFDELKSKCT	VYDG
5	323-357	IVNATFMEYWFEKGNDKEAMESYRSLLDKKFRMHP	-
6	358-392	PTGNVLLEVFLKFGKKDEAWALFNEMLDNHAPPNI	-
7	398-428	DTVGIMVNECFKMGEFSEAINTFKKVGSKVT	SKPFVMDY
8	437-471	LGYCNIVTRFCEQGMLTEAERFFAEGVSRSLPADA	-
9	472-506	PSHRAMIDAYLKAERIDDAVKMLDRMVDVNLRVVA	-
10	507-541	DFGARVFGELIKNGKLTESAEVLTKMGEREPKPDP	-
11	542-576	SIYDVVVRGLCDGDALDQAKDIVGEMIRHNVGVTT	-

[Fig. 5]


PPR-VP64
Expression Vector
CMV
Flag-NLS-PPR
VP64
polyA
4x/8x-PPR target sequence
Fluc Expression Vector
minCMV
Firefly luciferase (Fluc)
polyA
Rluc Expression Vector
CMV
Renilla luciferase (Rluc)
polyA
Transfection into huma culture cells (HEK293 cells)
Measurement of Activity by Luciferase Assay

[Fig. 6]


6
5
4
3
2
1
0
Fold activation
Negative control
4×target
8×target
pTac2-VP64
GUN1-VP64