Didier Picard, March 2022

List of HBD fusion proteins

Protein X [a]	HBD [b]	regulated as [c]	Refs.
Transcription factors			
APETALA3	GR	transcription factor in *Arabidopsis*	1
ATF6α	ER [e]	transcription factor	2
Athb-1	GR	*Arabidopsis* transcription factor in tobacco	3
Bob1/OBF1	ER [e]	coactivator	4
Chimeric dCas9 and dCas9-targeted synthetic activators	ER [e]	synthetic activator	5
CCAT (from calcium channel cav1.2)	ER [e]	transcription factor	6
C/EBP	ER, GR	transcription factor	7
C/EBPβ (=NF-M)	ER	transcription factor, differentiation factor	8
CLOCK	GR	transcription factor	9
CONSTANS	GR	putative transcription factor in *Arabidposis*	10
E1A	GR	transcription factor	11
E1A	ER	oncoprotein	12
E2F-1, -2, -3	ER	transcription factor	13
E2A	ER [e]	transcription factor	14
E7 (of HPV16)	ER	oncoprotein	g
EBNA2	ER [e]	oncoprotein	15
EBNA3C	ER [e]	oncoprotein	16
Erm (Ets family)	ER	transcription factor	17
c-Fos, v-Fos, FosB-L, FosB-S	ER, GR	oncoprotein, transcription factor	18,19
FOXO3a	ER	transcription factor	20
Gal4	ER, GR, MR, PR	transcription factor in yeast, tissue culture cells and zebra fish	21,22, i
Gal4-KRAB	PR [e]	transcriptional repressor	23
Gal4-Msn2 AD (GEM and GPM, respectively)	ER, PR	transcription factor in yeast	24
Gal4-p65 [d]	PR [e]	transcription factor ("GeneSwitch")	25
Gal4-VP16	ER, GR, PR [e]	transcription factor in yeast, in tissue culture cells, transgenic	23,26-33

		mice, *Xenopus*, *Drosophila* and plants	
GATA-1, -2, -3	ER	transcription factor, promoter of proliferation	34
Gcn4	ER, MR	transcription factor	35
Gli	ER	transcription factor	36
Hoxa9	ER	transcription factor	37
Hoxb8	ER	transcription factor	37
IRF-1	ER	transcription factor	38
c-Jun	ER	transcription factor	39
JunD	ER	transcription factor	40
v-Jun (DBD [f])	ER	as DNA binding factor	41
Klf1	ER [e]	transcription factor	42
LexA-p65 [d]	PR [e]	transcription factor in fish	43
LexA-VP16	ER	transcription factor in yeast and plants	i, 44,45
LhG4	GR	synthetic activator in plants	46,47
MT-MC1	ER [e]	transcription factor	48
v-Myb	ER	transcription factor	49
c-Myc	ER, GR	oncoprotein	50
MyoD	ER, TR, GR	transcription factor in tissue culture and frog embryos	51,52
Notch (ic)	ER	transcription factor	53
p53	ER	regulator of proliferation	54,55
Pax3-FKHR	ER [e]	transcription factor	56
Pax5	ER	transcription factor	57
Pax7	ER [e]	transcription factor	58
PU.1	ER	transcription factor	59
QF	GR	*Neurospora* transcription factor in *C. elegans*	60
R (of maize)	GR	transcription factor in *Arabidopsis*	61
v-Rel, c-Rel	ER	oncoprotein, transcription factor	62,63
RUNX1	ER [e]	transcription factor	64
Snail	ER [e]	transcription factor	65
Stat1, Stat5A, Stat5B	ER	transcription factor	66
Stat6	ER [e]	transcription factor	66,67
TLS-CHOP	ER	oncoprotein	68
Twist	ER [e]	transcription factor	65
Xbra	GR	transcription factor in frog embryos	69
Zif268-Msn2 AD (ZPM)	PR	transcription factor in yeast	24
Zinc finger TFs	ER [e], PR	artifical transcription factors	70,71
Zta	ER [e]	activator of EBV replication	72

Kinases			
Abl	ER, GR	oncoprotein, tyrosine kinase	73
Akt (=PKB)	ER *e*	serine / threonine kinase	74
erbB1	ER	tyrosine kinase	g
MEK1	ER *e*	oncoprotein, dual kinase	75
MEKK3	ER	activation of SAPK pathway	76
Raf-1	ER, AR	oncoprotein, serine / threonine kinase	77,78
A-Raf, B-Raf	ER	oncoproteins	79
Ste11	ER, MR, PR	serine / threonine kinase in yeast	80 and i
Src	ER	tyrosine kinase	g; see also ref. 81
Recombinases & nucleases			
AsiSI	ER *e*	restriction enzyme in tissue culture cells	82
Cas9	ER *e,j*	excision of intein from Cas9	83
Cas9	ER *e*	endonuclease	5,84
Split Cas9	ER *e,j*, GR*j*	endonuclease	85
Cre *k*	ER *e*, PR *e*, GR *e*, AR *e*	recombinase in tissue culture cells, transgenic mice and yeast	86-94
Flp	ER, GR, AR	recombinase in tissue culture cells and yeast	95,96
I-PpoI	ER *e*	homing endonuclease	97
I-SceI	GR	homing endonuclease	98
piggyBac transposase	ER *e*	in tissue culture cells	99
Miscellaneous			
BLNK	ER *e*	adaptor protein	100
β-catenin	ER *e*	signaling molecule	101
Cdc13	ER	cyclin (in *S. pombe*)	102
Fas	ER, RAR	apoptosis	103
Split ferredoxin	ER *e,j*	regulator of electron transfer	104
β-galactosidase	ER, PR	α-complementation in yeast	105
Gαq	ER *e*	G protein	106
HDAC3	ER *e*	histone deacetylase	107
Intein fusion	ER *e,j*	protein splicing	108,109
Split MetRS	ER *e,j*	methionyl tRNA synthetase	110
p16-INK4A	ER	CDK inhibitor	111
Psf2	ER	DNA replication (in *S. pombe*)	102

Rac1	ER *e*	signaling	112
Ras	ER	in yeast	113
Ras G12V & N17	ER *e*	signaling	114,115
Rep (of AAV)	ER, PR *e*	replication, integration	h, 116
Rev (of HIV)	GR	transactivation (RNA-binding protein)	117
Rex (of HTLV-1)	ER	Rex functions, localization	118
SIRT1	ER *e*	protein deacetylase	119
Telomerase	ER *e*	telomerase function	120
Thymidylate synthase	ER *e,j*	enzyme activity and growth in *E. coli*	121

Footnotes

a Proteins were alphabetically grouped into different classes.

b HBDs were from the following receptors: AR, ER, GR, MR, PR, RAR, and TR, androgen, estrogen, glucocorticoid, mineralocorticoid, progesterone, retinoic acid, and thyroid receptors, respectively.

c Unless indicated assays were done in vertebrate tissue culture cells.

d Contains activation domain of the NFκB component p65.

e Mutant HBDs that only (or also) respond to antihormones were used in some experiments.

f DBD, DNA binding domain.

g J. M. Bishop, personal communication.

h A. Salvetti, personal communication.

i Picard lab, unpublished results.

j For some, the mechanism of regulation involves a conformational rearrangement of the ends of the HBD.

k High level expression, at least in some tissues or cells, can lead to significant constitutive activity (refs. 122,123). In a dually inducible membrane-tethered version, a Hsp90-concealed TEV cutting site may contribute to lower background activity (124).

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