Didier Picard, April 2019

Current 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
CCAT (from calcium channel cav1.2)	ER [e]	transcription factor	5
C/EBP	ER, GR	transcription factor	6
C/EBPβ (=NF-M)	ER	transcription factor, differentiation factor	7
CLOCK	GR	transcription factor	8
CONSTANS	GR	putative transcription factor in arabidposis	9
E1A	GR	transcription factor	10
E1A	ER	oncoprotein	11
E2F-1, -2, -3	ER	transcription factor	12
E2A	ER [e]	transcription factor	13
E7 (of HPV16)	ER	oncoprotein	g
EBNA2	ER [e]	oncoprotein	14
EBNA3C	ER [e]	oncoprotein	15
Erm (Ets family)	ER	transcription factor	16
c-Fos, v-Fos, FosB-L, FosB-S	ER, GR	oncoprotein, transcription factor	17,18
FOXO3a	ER	transcription factor	19
Gal4	ER, GR, MR, PR	transcription factor in yeast, tissue culture cells and zebra fish	20, 21, i
Gal4-KRAB	PR [e]	transcriptional repressor	22
Gal4-p65 [d]	PR [e]	transcription factor	23
Gal4-VP16	ER, GR, PR [e]	transcription factor in yeast, in tissue culture cells, transgenic mice, *Xenopus*, *Drosophila* and plants	22,24-30
GATA-1, -2, -3	ER	transcription factor, promoter of proliferation	31
Gcn4	ER, MR	transcription factor	32
Gli	ER	transcription factor	33

Hoxa9	ER	transcription factor	34
Hoxb8	ER	transcription factor	34
IRF-1	ER	transcription factor	35
c-Jun	ER	transcription factor	36
JunD	ER	transcription factor	37
v-Jun (DBD [f])	ER	as DNA binding factor	38
Klf1	ER [e]	transcription factor	39
LexA-p65 [d]	PR [e]	transcription factor in fish	40
LexA-VP16	ER	transcription factor in yeast and plants	i, 41,42
MT-MC1	ER [e]	transcription factor	43
v-Myb	ER	transcription factor	44
c-Myc	ER, GR	oncoprotein	45
MyoD	ER, TR, GR	transcription factor in tissue culture and frog embryos	46,47
Notch (ic)	ER	transcription factor	48
p53	ER	regulator of proliferation	49,50
Pax3-FKHR	ER [e]	transcription factor	51
Pax5	ER	transcription factor	52
Pax7	ER [e]	transcription factor	53
PU.1	ER	transcription factor	54
QF	GR	*Neurospora* transcription factor in *C. elegans*	55
R (of maize)	GR	transcription factor in *Arabidopsis*	56
v-Rel, c-Rel	ER	oncoprotein, transcription factor	57,58
RUNX1	ER [e]	transcription factor	59
Snail	ER [e]	transcription factor	60
Stat1, Stat5A, Stat5B	ER	transcription factor	61
Stat6	ER [e]	transcription factor	61,62
TLS-CHOP	ER	oncoprotein	63
Twist	ER [e]	transcription factor	60
Xbra	GR	transcription factor in frog embryos	64
Zinc finger TFs	ER [e], PR	artifical transcription factors	65,66
Zta	ER [e]	activator of EBV replication	67
Kinases			
Abl	ER, GR	oncoprotein, tyrosine kinase	68
Akt (=PKB)	ER [e]	serine / threonine kinase	69
erbB1	ER	tyrosine kinase	g
MEK1	ER [e]	oncoprotein, dual kinase	70
MEKK3	ER	activation of SAPK pathway	71
Raf-1	ER, AR	oncoprotein, serine / threonine kinase	72,73

A-Raf, B-Raf	ER	oncoproteins	74
Ste11	ER, MR, PR	serine / threonine kinase in yeast	75 and i
Src	ER	tyrosine kinase	g; see also ref. 76
Split Cas9	ER *e*, GR	synthetic activator	77
Chimeric dCas9 and dCas9-targeted synthetic activators	ER *e*	synthetic activator	78
Recombinases & nucleases			
AsiSI	ER *e*	restriction enzyme in tissue culture cells	79
Cas9	ER *e*	excision of intein from Cas9	80
Cas9	ER *e*	endonuclease	78,81
Split Cas9	ER *e*, GR	endonuclease	77
Cre *j*	ER *e*, PR *e*, GR *e*, AR *e*	recombinase in tissue culture cells, transgenic mice and yeast	82-90
Flp	ER, GR, AR	recombinase in tissue culture cells and yeast	91,92
I-PpoI	ER *e*	homing endonuclease	93
I-SceI	GR	homing endonuclease	94
piggyBac transposase	ER *e*	in tissue culture cells	95
Miscellaneous			
BLNK	ER *e*	adaptor protein	96
β-catenin	ER *e*	signaling molecule	97
Cdc13	ER	cyclin (in *S. pombe*)	98
Fas	ER, RAR	apoptosis	99
β-galactosidase	ER, PR	α-complementation in yeast	100
Gαq	ER *e*	G protein	101
HDAC3	ER *e*	histone deacetylase	102
Intein fusion	ER *e*	protein splicing	103,104
p16-INK4A	ER	CDK inhibitor	105
Psf2	ER	DNA replication (in *S. pombe*)	98
Ras	ER	in yeast	106
Ras G12V	ER *e*	oncogene transformation	107
Rep (of AAV)	ER, PR *e*	replication, integration	h, 108
Rev (of HIV)	GR	transactivation (RNA-binding protein)	109
Rex (of HTLV-1)	ER	Rex functions, localization	110
SIRT1	ER *e*	Protein deacetylase	111

Telomerase	ER *e*	telomerase function	112
Thymidylate synthase	ER *e*	enzyme activity and growth in *E. coli*	113

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 High level expression, at least in some tissues or cells, can lead to significant constitutive activity (refs. 114,115).

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