

## Current list of HBD fusion proteins

Protein X <sup>a</sup>	HBD <sup>b</sup>	regulated as <sup>c</sup>	Refs.
<b>Transcription factors</b>			
APETALA3	GR	transcription factor in Arabidopsis	1
ATF6 $\alpha$	ER <sup>e</sup>	transcription factor	2
Athb-1	GR	Arabidopsis transcription factor in tobacco	3
Bob1/OBF1	ER <sup>e</sup>	coactivator	4
CCAT (from calcium channel cav1.2)	ER <sup>e</sup>	transcription factor	5
C/EBP	ER, GR	transcription factor	6
C/EBP $\beta$ (=NF-M)	ER	transcription factor, differentiation factor	7
CLOCK	GR	transcription factor	8
CONSTANS	GR	putative transcription factor in arabidopsis	9
E1A	GR	transcription factor	10
E1A	ER	oncoprotein	11
E2F-1, -2, -3	ER	transcription factor	12
E2A	ER <sup>e</sup>	transcription factor	13
E7 (of HPV16)	ER	oncoprotein	9
EBNA2	ER <sup>e</sup>	oncoprotein	14
EBNA3C	ER <sup>e</sup>	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 <sup>e</sup>	transcriptional repressor	22
Gal4-p65 <sup>d</sup>	PR <sup>e</sup>	transcription factor	23
Gal4-VP16	ER, GR, PR <sup>e</sup>	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 <i>f</i> )	ER	as DNA binding factor	38
Klf1	ER <i>e</i>	transcription factor	39
LexA-p65 <i>d</i>	PR <i>e</i>	transcription factor in fish	40
LexA-VP16	ER	transcription factor in yeast and plants	i, 41,42
MT-MC1	ER <i>e</i>	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 <i>e</i>	transcription factor	51
Pax5	ER	transcription factor	52
Pax7	ER <i>e</i>	transcription factor	53
PU.1	ER	transcription factor	54
R (of maize)	GR	transcription factor in Arabidopsis	55
v-Rel, c-Rel	ER	oncoprotein, transcription factor	56,57
RUNX1	ER <i>e</i>	transcription factor	58
Snail	ER <i>e</i>	transcription factor	59
Stat1, Stat5A, Stat5B	ER	transcription factor	60
Stat6	ER <i>e</i>	transcription factor	60,61
TLS-CHOP	ER	oncoprotein	62
Twist	ER <i>e</i>	transcription factor	59
Xbra	GR	transcription factor in frog embryos	63
Zinc finger TFs	ER <i>e</i> , PR	artificial transcription factors	64,65
Zta	ER <i>e</i>	activator of EBV replication	66
<b>Kinases</b>			
Abl	ER, GR	oncoprotein, tyrosine kinase	67
Akt (=PKB)	ER <i>e</i>	serine / threonine kinase	68
erbB1	ER	tyrosine kinase	g
MEK1	ER <i>e</i>	oncoprotein, dual kinase	69
MEKK3	ER	activation of SAPK pathway	70
Raf-1	ER, AR	oncoprotein, serine / threonine kinase	71,72
A-Raf, B-Raf	ER	oncoproteins	73
Ste11	ER, MR, PR	serine / threonine kinase in yeast	74 and i

Src	ER	tyrosine kinase	g; see also ref. 75
Split Cas9	ER <i>e</i> , GR	Synthetic activator	76
Chimeric dCas9 and dCas9- targeted synthetic activators	ER <i>e</i>	Synthetic activator	77
<b>Recombinases &amp; nucleases</b>			
AsiSI	ER <i>e</i>	Restriction enzyme in tissue culture cells	78
Cas9	ER <i>e</i>	Excision of intein from Cas9	79
Cas9	ER <i>e</i>	Endonuclease	77,80
Split Cas9	ER <i>e</i> , GR	Endonuclease	76
Cre <i>j</i>	ER <i>e</i> , PR <i>e</i> , GR <i>e</i> , AR <i>e</i>	recombinase in tissue culture cells, transgenic mice and yeast	81-89
Flp	ER, GR, AR	recombinase in tissue culture cells and yeast	90,91
I-Ppol	ER <i>e</i>	homing endonuclease	92
<i>piggyBac</i> transposase	ER <i>e</i>	in tissue culture cells	93
<b>Miscellaneous</b>			
BLNK	ER <i>e</i>	adaptor protein	94
$\beta$ -catenin	ER <i>e</i>	signaling molecule	95
Cdc13	ER	cyclin (in <i>S. pombe</i> )	96
Fas	ER, RAR	apoptosis	97
$\beta$ -galactosidase	ER, PR	$\alpha$ -complementation in yeast	98
G $\alpha_q$	ER <i>e</i>	G protein	99
HDAC3	ER <i>e</i>	histone deacetylase	100
Intein fusion	ER <i>e</i>	protein splicing	101,102
p16-INK4A	ER	CDK inhibitor	103
Psf2	ER	DNA replication (in <i>S. pombe</i> )	96
Ras	ER	in yeast	104
Ras G12V	ER <i>e</i>	oncogene transformation	105
Rep (of AAV)	ER, PR <i>e</i>	replication, integration	h, 106
Rev (of HIV)	GR	transactivation (RNA-binding protein)	107
Rex (of HTLV-1)	ER	Rex functions, localization	108
SIRT1	ER <i>e</i>	Protein deacetylase	109
Telomerase	ER <i>e</i>	Telomerase function	110
Thymidylate synthase	ER <i>e</i>	Enzyme activity and growth in <i>E.</i> <i>coli</i>	111

## 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 NF $\kappa$ B 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. 112,113).

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