

HSP90 INTERACTORS

Chaperones and relatives:

- Aha1 and its homolog Hch1
- Cdc37 (p50) and its relative Harc
- p23 (=Sba1)
- CS-containing p23 relatives SGT1, RAR1, Siah-1-interacting protein (SIP), Chp1, B-ind1
- Hsp70
- Human DnaJ homolog Hsj1b
- proteins with TPR motifs, including Hop (=Sti1), FKBP52 (and high MW plant homologs), FKBP51, FKBP8 (=FKBP38), Plasmodium FKBP35, cyclophilin-40 (Cpr6 and Cpr7), PP5 (and yeast Ppt1), Tom70, XAP-2 (=AIP=ARA9), Cns1 and its Drosophila and human relatives Dpit47 and TTC4, CHIP, GCUNC-45 (also UNC-45 and She4), DnaJC7 (=Tpr2=mDj11=CCRP), CRN, WISp39, Tah1 (=Spaghetti), NASP, Toc64, TPR1 (=Ttc1),
- S100A1
- Sse1
- valosin-containing protein (VCP)/p97
- NudC
- Pih1 (=Nop17) (only through Tah1?)

Transcription factors:

- 12(S)-HETE receptor
- all vertebrate steroid receptors (GR, MR, ER, PR, AR)
- CAR
- cytoplasmic v-erbA
- EcR
- PPAR α (PPAR β)
- PXR
- Hap1
- HSF-1
- IRF3
- Mal63
- p53
- PAS family members: Dioxin receptor (=AhR), Sim, HIF-1 α , HIF-2 α , HIF-3 α
- Stat3 (also in caveolin-1 complexes in rafts)
- TonEBP/OREBP

- water mold *Achlya* steroid (antheridiol) receptor

Kinases:

- Akt/PKB
- ASK1
- Aurora B
- Bcr-Abl
- casein kinase II α catalytic subunit
- Cdk2, Cdk4, Cdk6, Cdk9, Cdk11
- Chk1
- Cot = Tpl-2
- Death-associated kinases DAPK, DAPK2, DAPK3
- death domain kinase RIP
- eEF-2 kinase
- eIF2- α kinases HRI, Gcn2, Perk, PKR
- ErbB2 (and mutant EGF receptor)
- ERK5
- Flt3
- Fused
- GRK2
- I κ B kinases α , β , γ , ϵ
- insulin receptor
- Integrin-linked kinase
- IP6K2
- IRAK-1
- Ire1
- JAK1
- JNK
- c-Kit mutant
- KSR
- Lkb1
- LRRK2
- MEK
- MEKK1 and MEKK3
- Mik1
- MLK3
- MOK, MAK, MRK
- c-Mos
- NIK
- Nucleophosmin-Anaplastic Lymphoma Kinase
- platelet-derived growth factor receptor α
- PDK1
- Pim-1
- Pink1
- PKC λ

- Plk1
- pp60v-src, c-src
- src related tyrosine kinases: yes, fps, fes, fgr, and lck
- Raf-1, B-Raf, Ste11
- RET/PTC1
- Ron
- Slit2
- SSTRK
- TAK1
- TBK1
- trkB
- VEGFR1, VEGFR2
- Wee1, Swe1
- ZAP-70

Others:

- Annexin II
- ANP receptor
- Apaf-1
- apoB
- Bid
- calcineurin (Cna2; catalytic subunit)
- calmodulin
- calponin
- CB2 cannabinoid receptor
- Cdk5 activator p35
- CFTR (nascent polypeptide)
- CIC-2 chloride channel
- COG complex
- Ctf13/Skp1 component of CBF3
- cyclin B
- cyclophilin D (mitochondrial)
- cytoskeletal proteins: actin, tubulin (including ciliary β 4-tubulin), myosin
- Dengue virus protein E
- DNA polymerase α
- eNOS, nNOS (?)
- ether-a-gogo-related cardiac potassium channel
- FLIP_S and FLIP_L
- free $\beta\gamma$ subunit of G protein
- G α_0 , G α_{12}
- GERp95 (= Argonaute-2)
- glutathione S-transferase subunit 3 (KS type)
- HDAC6
- HERG
- Histones H1, H2A, H2B, H3 and H4
- c-IAP1
- Kir6.2
- knob complexes (in the membrane of Plasmodium-infected erythrocytes)
- macromolecular aminoacyl-tRNA synthetase complex
- Macrophage scavenger receptor
- Mdm2
- MMP2
- MRE11/Rad50/NBS1 (MRN) complex
- Msps/XMAP215/ch-TOG
- MTG8
- MUC1
- Na⁺-K⁺-Cl⁻ cotransporter 1
- NB-LRR proteins: RPM1 and RPS2, Nod1, Nod2, NALP2, NALP3, NALP4, NALP12, IPAFA
- Neuropeptide Y
- N-WASP
- P1 (picornaviral capsid precursor protein P1)
- P450 CYP2E1
- P2X₇ purinergic receptor
- PB2 subunit of influenza RNA pol.
- perilipin
- Mg²⁺-dependent phosphatidate phosphohydrolase
- polysomal ribonuclease 1 (PMR1)
- prolactin receptor
- proteasome
- Rab- α GDI
- Rac/Rop GTPase Rac1 (rice)
- Ral-binding protein 1
- reovirus protein σ 1
- reverse transcriptase of hepatitis B virus
- ribosomal proteins S3 and S6
- R2TP complex through Pih1
- R-protein I-2
- SIR2 (SIR2RP1 in Leishmania)
- SKP2 complexes
- SMYD1, SMYD2, SMYD3
- snoRNP complexes
- DNA helicase Ssl2
- survivin
- SV40 large T-antigen
- α -synuclein
- Tau protein
- telomerase
- thiopurine S-methyltransferase
- thrombin receptor (PAR-1)
- TLR4/MD-2 complex
- Vaccinia core protein 4a
- misfolded VHL
- Vimentin

Notes:

- Only the cytosolic form of Hsp90 was considered.
- Only proteins are listed for which biochemical evidence for an interaction is available (i.e. geldanamycin effects alone were not considered sufficient).
- more candidate interactors can be found in reports about proteomic approaches (Falsone et al. [2005] FEBS Lett. 579, 6350; Te et al. (2007) J. Proteome Res. 6, 1963), global analyses (e.g. Zhao et al. [2005] Cell 120, 715; Millson et al. [2005] Euk. Cell 4, 849; McClellan et al. [2007] Cell 131, 121), and in a pharmacological survey of kinases (Citri et al. [2006] J. Biol. Chem. 281, 14361).
- **Looking for references? See <http://www.picard.ch/downloads/Hsp90facts.pdf>.**