

PARP	Genome Maintenance	Transcription	Translation and mRNA stability	Cell cycle	Cell death	Cell structure and motility	Transport	Metabolism	Cell signaling
1	(de Murcia et al., 1997)	(Kraus and Hottiger, 2013)		(Saxena et al., 2002)	(Hong et al., 2004)			(Bai and Canto, 2012)	(Andreone et al., 2003)
2	(Ame et al., 1999)	(Szanto et al., 2012)		(Liang et al., 2013)	(Li et al., 2010)			(Bai and Canto, 2012)	(Wyrsh et al., 2012)
3	(Boehler et al., 2011)	(Rouleau et al., 2011)		(Augustin et al., 2003)					
4				(Kickhoefer et al., 1999)			(van Zon et al., 2003)		
5a	(Smith et al., 1998)		(Leung et al., 2011)	(Chang et al., 2005)	(Bae et al., 2003)		(Yeh et al., 2007)		(Huang et al., 2009)
5b	(Cook et al., 2002)				(Kaminker et al., 2001)				(Huang et al., 2009)
6				(Tuncel et al., 2012)					
7		(MacPherson et al., 2013)		(Roper et al., 2014)					
8									
9	(Yan et al., 2013)	(Aguiar et al., 2005)							(Juszczynski et al., 2006)
10	(Nicolae et al., 2014)	(Yu et al., 2005)		(Chou et al., 2006)	(Herzog et al., 2013)				(Verheugd et al., 2013)
11						(Meyer-Ficca et al., 2015)			
12			(Welsby et al., 2014)						(Atasheva et al., 2014)
13			(Leung et al., 2011)						(Hayakawa et al., 2011)
14	(Nicolae et al., 2015)	(Mehrotra et al., 2011)	(Iqbal et al., 2014)			(Vyas et al., 2013)		(Cho et al., 2011)	(Goenka and Boothby, 2006)
15		(Aguiar et al., 2005)	(Leung et al., 2011)						
16							(Di Paola et al., 2012)		(Jwa and Chang, 2012)

References for supporting examples of PARP functions:

- Aguiar, R.C., Takeyama, K., He, C., Kreinbrink, K., and Shipp, M.A. (2005). B-aggressive lymphoma family proteins have unique domains that modulate transcription and exhibit poly(ADP-ribose) polymerase activity. *The Journal of biological chemistry* *280*, 33756-33765.
- Ame, J.C., Rolli, V., Schreiber, V., Niedergang, C., Apiou, F., Decker, P., Muller, S., Hoger, T., Menissier-de Murcia, J., and de Murcia, G. (1999). PARP-2, A novel mammalian DNA damage-dependent poly(ADP-ribose) polymerase. *J Biol Chem* *274*, 17860-17868.
- Andreone, T.L., O'Connor, M., Denenberg, A., Hake, P.W., and Zingarelli, B. (2003). Poly(ADP-ribose) polymerase-1 regulates activation of activator protein-1 in murine fibroblasts. *Journal of immunology* *170*, 2113-2120.
- Atasheva, S., Frolova, E.I., and Frolov, I. (2014). Interferon-stimulated poly(ADP-Ribose) polymerases are potent inhibitors of cellular translation and virus replication. *J Virol* *88*, 2116-2130.
- Augustin, A., Spenlehauer, C., Dumond, H., Menissier-De Murcia, J., Piel, M., Schmit, A.C., Apiou, F., Vonesch, J.L., Kock, M., Bornens, M., *et al.* (2003). PARP-3 localizes preferentially to the daughter centriole and interferes with the G1/S cell cycle progression. *Journal of cell science* *116*, 1551-1562.
- Bae, J., Donigian, J.R., and Hsueh, A.J. (2003). Tankyrase 1 interacts with Mcl-1 proteins and inhibits their regulation of apoptosis. *The Journal of biological chemistry* *278*, 5195-5204.
- Bai, P., and Canto, C. (2012). The role of PARP-1 and PARP-2 enzymes in metabolic regulation and disease. *Cell metabolism* *16*, 290-295.
- Boehler, C., Gauthier, L.R., Mortusewicz, O., Biard, D.S., Saliou, J.M., Bresson, A., Sanglier-Cianferani, S., Smith, S., Schreiber, V., Boussin, F., *et al.* (2011). Poly(ADP-ribose) polymerase 3 (PARP3), a newcomer in cellular response to DNA damage and mitotic progression. *Proceedings of the National Academy of Sciences of the United States of America* *108*, 2783-2788.
- Chang, P., Coughlin, M., and Mitchison, T.J. (2005). Tankyrase-1 polymerization of poly(ADP-ribose) is required for spindle structure and function. *Nat Cell Biol* *7*, 1133-1139.
- Cho, S.H., Ahn, A.K., Bhargava, P., Lee, C.H., Eischen, C.M., McGuinness, O., and Boothby, M. (2011). Glycolytic rate and lymphomagenesis depend on PARP14, an ADP ribosyltransferase of the B aggressive lymphoma (BAL) family. *Proceedings of the National Academy of Sciences of the United States of America* *108*, 15972-15977.
- Chou, H.Y., Chou, H.T., and Lee, S.C. (2006). CDK-dependent activation of poly(ADP-ribose) polymerase member 10 (PARP10). *The Journal of biological chemistry* *281*, 15201-15207.
- Cook, B.D., Dynek, J.N., Chang, W., Shostak, G., and Smith, S. (2002). Role for the related poly(ADP-Ribose) polymerases tankyrase 1 and 2 at human telomeres. *Molecular and cellular biology* *22*, 332-342.
- de Murcia, J.M., Niedergang, C., Trucco, C., Ricoul, M., Dutrillaux, B., Mark, M., Oliver, F.J., Masson, M., Dierich, A., LeMeur, M., *et al.* (1997). Requirement of poly(ADP-ribose) polymerase in recovery from DNA damage in mice and in cells. *Proceedings of the National Academy of Sciences of the United States of America* *94*, 7303-7307.
- Di Paola, S., Micaroni, M., Di Tullio, G., Buccione, R., and Di Girolamo, M. (2012). PARP16/ARTD15 is a novel endoplasmic-reticulum-associated mono-ADP-ribosyltransferase that interacts with, and modifies karyopherin-ss1. *PloS one* *7*, e37352.
- Goenka, S., and Boothby, M. (2006). Selective potentiation of Stat-dependent gene expression by collaborator of Stat6 (CoaSt6), a transcriptional cofactor. *Proceedings of the National Academy of Sciences of the United States of America* *103*, 4210-4215.
- Hayakawa, S., Shiratori, S., Yamato, H., Kameyama, T., Kitatsuji, C., Kashigi, F., Goto, S., Kameoka, S., Fujikura, D., Yamada, T., *et al.* (2011). ZAPS is a potent stimulator of signaling mediated by the RNA helicase RIG-I during antiviral responses. *Nature immunology* *12*, 37-44.
- Herzog, N., Hartkamp, J.D., Verheugd, P., Treude, F., Forst, A.H., Feijs, K.L., Lippok, B.E., Kremmer, E., Kleine, H., and Luscher, B. (2013). Caspase-dependent cleavage of the mono-ADP-ribosyltransferase ARTD10 interferes with its pro-apoptotic function. *FEBS J* *280*, 1330-1343.
- Hong, S.J., Dawson, T.M., and Dawson, V.L. (2004). Nuclear and mitochondrial conversations in cell death: PARP-1 and AIF signaling. *Trends in pharmacological sciences* *25*, 259-264.

- Huang, S.M., Mishina, Y.M., Liu, S., Cheung, A., Stegmeier, F., Michaud, G.A., Charlat, O., Wiелlette, E., Zhang, Y., Wiessner, S., *et al.* (2009). Tankyrase inhibition stabilizes axin and antagonizes Wnt signalling. *Nature* *461*, 614-620.
- Iqbal, M.B., Johns, M., Cao, J., Liu, Y., Yu, S.C., Hyde, G.D., Laffan, M.A., Marchese, F.P., Cho, S.H., Clark, A.R., *et al.* (2014). PARP-14 combines with tristetraprolin in the selective posttranscriptional control of macrophage tissue factor expression. *Blood* *124*, 3646-3655.
- Juszczynski, P., Kutok, J.L., Li, C., Mitra, J., Aguiar, R.C., and Shipp, M.A. (2006). BAL1 and BBAP are regulated by a gamma interferon-responsive bidirectional promoter and are overexpressed in diffuse large B-cell lymphomas with a prominent inflammatory infiltrate. *Molecular and cellular biology* *26*, 5348-5359.
- Jwa, M., and Chang, P. (2012). PARP16 is a tail-anchored endoplasmic reticulum protein required for the PERK- and IRE1alpha-mediated unfolded protein response. *Nature cell biology* *14*, 1223-1230.
- Kaminker, P.G., Kim, S.H., Taylor, R.D., Zebarjadian, Y., Funk, W.D., Morin, G.B., Yaswen, P., and Campisi, J. (2001). TANK2, a new TRF1-associated poly(ADP-ribose) polymerase, causes rapid induction of cell death upon overexpression. *The Journal of biological chemistry* *276*, 35891-35899.
- Kickhoefer, V.A., Siva, A.C., Kedersha, N.L., Inman, E.M., Ruland, C., Streuli, M., and Rome, L.H. (1999). The 193-kD vault protein, VPARP, is a novel poly(ADP-ribose) polymerase. *J Cell Biol* *146*, 917-928.
- Kraus, W.L., and Hottiger, M.O. (2013). PARP-1 and gene regulation: progress and puzzles. *Molecular aspects of medicine* *34*, 1109-1123.
- Leung, A.K., Vyas, S., Rood, J.E., Bhutkar, A., Sharp, P.A., and Chang, P. (2011). Poly(ADP-ribose) regulates stress responses and microRNA activity in the cytoplasm. *Mol Cell* *42*, 489-499.
- Li, X., Klaus, J.A., Zhang, J., Xu, Z., Kibler, K.K., Andrabi, S.A., Rao, K., Yang, Z.J., Dawson, T.M., Dawson, V.L., *et al.* (2010). Contributions of poly(ADP-ribose) polymerase-1 and -2 to nuclear translocation of apoptosis-inducing factor and injury from focal cerebral ischemia. *Journal of neurochemistry* *113*, 1012-1022.
- Liang, Y.C., Hsu, C.Y., Yao, Y.L., and Yang, W.M. (2013). PARP-2 regulates cell cycle-related genes through histone deacetylation and methylation independently of poly(ADP-ribosylation). *Biochemical and biophysical research communications* *431*, 58-64.
- MacPherson, L., Tamblyn, L., Rajendra, S., Bralha, F., McPherson, J.P., and Matthews, J. (2013). 2,3,7,8-Tetrachlorodibenzo-p-dioxin poly(ADP-ribose) polymerase (TiPARP, ARTD14) is a mono-ADP-ribosyltransferase and repressor of aryl hydrocarbon receptor transactivation. *Nucleic acids research* *41*, 1604-1621.
- Mehrotra, P., Riley, J.P., Patel, R., Li, F., Voss, L., and Goenka, S. (2011). PARP-14 functions as a transcriptional switch for Stat6-dependent gene activation. *J Biol Chem* *286*, 1767-1776.
- Meyer-Ficca, M.L., Ihara, M., Bader, J.J., Leu, N.A., Beneke, S., and Meyer, R.G. (2015). Spermatid head elongation with normal nuclear shaping requires ADP-ribosyltransferase PARP11 (ARTD11) in mice. *Biol Reprod* *92*, 80.
- Nicolae, C.M., Aho, E.R., Choe, K.N., Constantin, D., Hu, H.J., Lee, D., Myung, K., and Moldovan, G.L. (2015). A novel role for the mono-ADP-ribosyltransferase PARP14/ARTD8 in promoting homologous recombination and protecting against replication stress. *Nucleic Acids Res* *43*, 3143-3153.
- Nicolae, C.M., Aho, E.R., Vlahos, A.H., Choe, K.N., De, S., Karras, G.I., and Moldovan, G.L. (2014). The ADP-ribosyltransferase PARP10/ARTD10 interacts with proliferating cell nuclear antigen (PCNA) and is required for DNA damage tolerance. *The Journal of biological chemistry* *289*, 13627-13637.
- Roper, S.J., Chrysanthou, S., Senner, C.E., Sienerth, A., Gnan, S., Murray, A., Masutani, M., Latos, P., and Hemberger, M. (2014). ADP-ribosyltransferases Parp1 and Parp7 safeguard pluripotency of ES cells. *Nucleic Acids Res* *42*, 8914-8927.
- Rouleau, M., Saxena, V., Rodrigue, A., Paquet, E.R., Gagnon, A., Hendzel, M.J., Masson, J.Y., Ekker, M., and Poirier, G.G. (2011). A key role for poly(ADP-ribose) polymerase 3 in ectodermal specification and neural crest development. *PLoS One* *6*, e15834.
- Saxena, A., Saffery, R., Wong, L.H., Kalitsis, P., and Choo, K.H. (2002). Centromere proteins Cenpa, Cenpb, and Bub3 interact with poly(ADP-ribose) polymerase-1 protein and are poly(ADP-ribosylated). *The Journal of biological chemistry* *277*, 26921-26926.
- Smith, S., Gariat, I., Schmitt, A., and de Lange, T. (1998). Tankyrase, a poly(ADP-ribose) polymerase at human telomeres. *Science* *282*, 1484-1487.
- Szanto, M., Brunyanszki, A., Kiss, B., Nagy, L., Gergely, P., Virag, L., and Bai, P. (2012). Poly(ADP-ribose) polymerase-2: emerging transcriptional roles of a DNA-repair protein. *Cell Mol Life Sci* *69*, 4079-4092.

- Tuncel, H., Tanaka, S., Oka, S., Nakai, S., Fukutomi, R., Okamoto, M., Ota, T., Kaneko, H., Tatsuka, M., and Shimamoto, F. (2012). PARP6, a mono(ADP-ribosyl) transferase and a negative regulator of cell proliferation, is involved in colorectal cancer development. *International journal of oncology* *41*, 2079-2086.
- van Zon, A., Mossink, M.H., Schoester, M., Houtsmuller, A.B., Scheffer, G.L., Scheper, R.J., Sonneveld, P., and Wiemer, E.A. (2003). The formation of vault-tubes: a dynamic interaction between vaults and vault PARP. *Journal of cell science* *116*, 4391-4400.
- Verheugd, P., Forst, A.H., Milke, L., Herzog, N., Feijs, K.L., Kremmer, E., Kleine, H., and Luscher, B. (2013). Regulation of NF-kappaB signalling by the mono-ADP-ribosyltransferase ARTD10. *Nat Commun* *4*, 1683.
- Vyas, S., Chesarone-Cataldo, M., Todorova, T., Huang, Y.H., and Chang, P. (2013). A systematic analysis of the PARP protein family identifies new functions critical for cell physiology. *Nat Commun* *4*, 2240.
- Welsby, I., Hutin, D., Gueydan, C., Kruys, V., Rongvaux, A., and Leo, O. (2014). PARP12, an Interferon-stimulated Gene Involved in the Control of Protein Translation and Inflammation. *The Journal of biological chemistry* *289*, 26642-26657.
- Wyrsh, P., Blenn, C., Bader, J., and Althaus, F.R. (2012). Cell death and autophagy under oxidative stress: roles of poly(ADP-Ribose) polymerases and Ca(2+). *Mol Cell Biol* *32*, 3541-3553.
- Yan, Q., Xu, R., Zhu, L., Cheng, X., Wang, Z., Manis, J., and Shipp, M.A. (2013). BAL1 and its partner E3 ligase, BBAP, link Poly(ADP-ribose) activation, ubiquitylation, and double-strand DNA repair independent of ATM, MDC1, and RNF8. *Mol Cell Biol* *33*, 845-857.
- Yeh, T.Y., Sbodio, J.I., Tsun, Z.Y., Luo, B., and Chi, N.W. (2007). Insulin-stimulated exocytosis of GLUT4 is enhanced by IRAP and its partner tankyrase. *The Biochemical journal* *402*, 279-290.
- Yu, M., Schreek, S., Cerni, C., Schamberger, C., Lesniewicz, K., Poreba, E., Vervoorts, J., Walsemann, G., Grotzinger, J., Kremmer, E., *et al.* (2005). PARP-10, a novel Myc-interacting protein with poly(ADP-ribose) polymerase activity, inhibits transformation. *Oncogene* *24*, 1982-1993.