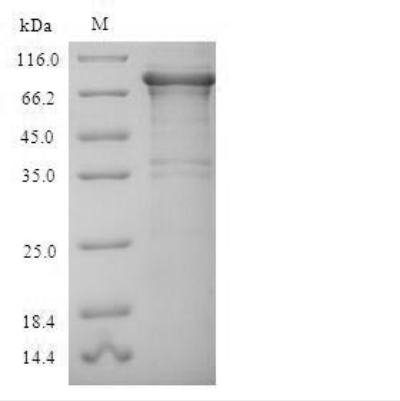
Recombinant Human Replication protein A 70 kDa DNA-binding subunit (RPA1)

Product Code	CSB-EP020088HU
Relevance	As part of the heterotrimeric replication protein A complex (RPA/RP-A), binds and stabilizes single-stranded DNA intermediates, that form during DNA replication or upon DNA stress. It prevents their reannealing and in parallel, recruits and activates different proteins and complexes involved in DNA metabolism. Thereby, it plays an essential role both in DNA replication and the cellular response to DNA damage . In the cellular response to DNA damage, the RPA complex controls DNA repair and DNA damage checkpoint activation. Through recruitment of ATRIP activates the ATR kinase a master regulator of the DNA damage response . It is required for the recruitment of the DNA double-strand break repair factors RAD51 and RAD52 to chromatin in response to DNA damage . Also recruits to sites of DNA damage proteins like XPA and XPG that are involved in nucleotide excision repair and is required for this mechanism of DNA repair . Plays also a role in base excision repair (BER) probably through interaction with UNG . Through RFWD3 may activate CHEK1 and play a role in replication checkpoint control. Also recruits SMARCAL1/HARP, which is involved in replication fork restart, to sites of DNA damage. May also play a role in telomere maintenance . As part of the alternative replication protein A complex, aRPA, binds single-stranded DNA and probably plays a role in DNA repair. Compared to the RPA2-containing, canonical RPA complex, may not support chromosomal DNA replication and cell cycle progression through S-phase. The aRPA may not promote efficient priming by DNA polymerase alpha but could support DNA synthesis by polymerase delta in presence of PCNA and replication factor C (RFC), the dual incision/excision reaction of nucleotide excision repair and RAD51-dependent strand exchange
Storage	The shelf life is related to many factors, storage state, buffer ingredients, storage temperature and the stability of the protein itself. Generally, the shelf life of liquid form is 6 months at -20°C/-80°C. The shelf life of lyophilized form is 12 months at -20°C/-80°C.
Uniprot No.	P27694
Alias	Replication factor A protein 1 ;RF-A protein 1Single-stranded DNA-binding protein
Product Type	Recombinant Protein
Immunogen Species	Homo sapiens (Human)
Purity	Greater than 90% as determined by SDS-PAGE.
Sequence	VGQLSEGAIAAIMQKGDTNIKPILQVINIRPITTGNSPPRYRLLMSDGLNTLSSFM LATQLNPLVEEEQLSSNCVCQIHRFIVNTLKDGRRVVILMELEVLKSAEAVGVKI GNPVPYNEGLGQPQVAPPAPAASPAASSRPQPQNGSSGMGSTVSKAYGASK TFGKAAGPSLSHTSGGTQSKVVPIASLTPYQSKWTICARVTNKSQIRTWSNSR GEGKLFSLELVDESGEIRATAFNEQVDKFFPLIEVNKVYYFSKGTLKIANKQFTA VKNDYEMTFNNETSVMPCEDDHHLPTVQFDFTGIDDLENKSKDSLVDIIGICKS

	YEDATKITVRSNNREVAKRNIYLMDTSGKVVTATLWGEDADKFDGSRQPVLAI KGARVSDFGGRSLSVLSSSTIIANPDIPEAYKLRGWFDAEGQALDGVSISDLKS GGVGGSNTNWKTLYEVKSENLGQGDKPDYFSSVATVVYLRKENCMYQACPT QDCNKKVIDQQNGLYRCEKCDTEFPNFKYRMILSVNIADFQENQWVTCFQES AEAILGQNAAYLGELKDKNEQAFEEVFQNANFRSFIFRVRVKVETYNDESRIKA TVMDVKPVDYREYGRRLVMSIRRSALM
Lead Time	3-7 business days
Research Area	Epigenetics and Nuclear Signaling
Source	E.coli
Gene Names	RPA1
Expression Region	2-616aa
Notes	Repeated freezing and thawing is not recommended. Store working aliquots at 4°C for up to one week.
Tag Info	N-terminal 6xHis-SUMO-tagged
Mol. Weight	84.0kDa
Protein Description	Full Length of Mature Protein

Image



(Tris-Glycine gel) Discontinuous SDS-PAGE (reduced) with 5% enrichment gel and 15% separation gel.

Description

Producing recombinant human replication protein A 70 kDa DNA-binding subunit (RPA1) in E. coli involves co-cloning the target gene (2-616aa of human RPA1) into an expression vector with an N-terminal 6xHis-SUMO-tag gene, which is introduced into E. coli cells. The cells are cultured under conditions that promote protein expression. After sufficient growth, the cells are lysed to release the recombinant RPA1 protein. The collected proteins undergo affinity chromatography purification. The purity of the recombinant RPA1 protein is assessed using SDS-PAGE, exceeding 90%.

Human RPA1 is a crucial component of the Replication Protein A (RPA) complex, which is a heterotrimeric single-stranded DNA-binding protein essential for various DNA processes in eukaryotic cells. RPA1 possesses strong single-stranded DNA binding activity. It plays a critical role in DNA metabolism, including processes such as replication, recombination, and repair [1-3].

RPA1 is crucial for maintaining genomic stability and ensuring accurate DNA

replication [5]. Additionally, RPA1 is phosphorylated to facilitate mitotic exit in response to DNA damage during cell division [6]. The complex nature of RPA1, with its multiple functional domains, underscores its importance in DNA replication and repair processes [4] [5].

References:
[1] G. Dodson, Y. Shi, & R. Tibbetts, Dna replication defects, spontaneous dna damage, and atm-dependent checkpoint activation in replication protein a-deficient cells, Journal of Biological Chemistry, vol. 279, no. 32, p. 34010-34014, 2004. https://doi.org/10.1074/jbc.c400242200
[2] H. He, J. Wang, & T. Liu, Uv-induced rpa1 acetylation promotes nucleotide excision repair, Cell Reports, vol. 20, no. 9, p. 2010-2025, 2017. https://doi.org/10.1016/j.celrep.2017.08.016
[3] E. Bochkareva, L. Frappier, A. Edwards, & A. Bochkarev, The rpa32 subunit of human replication protein a contains a single-stranded dna-binding domain, Journal of Biological Chemistry, vol. 273, no. 7, p. 3932-3936, 1998. https://doi.org/10.1074/jbc.273.7.3932
[4] H. Kim and S. Brill, Rfc4 interacts with rpa1 and is required for both dna replication and dna damage checkpoints in saccharomyces cerevisiae, Molecular and Cellular Biology, vol. 21, no. 11, p. 3725-3737, 2001. https://doi.org/10.1128/mcb.21.11.3725-3737.2001
[5] S. Binz and M. Wold, Regulatory functions of the n-terminal domain of the 70-kda subunit of replication protein a (rpa), Journal of Biological Chemistry, vol. 283, no. 31, p. 21559-21570, 2008. https://doi.org/10.1074/jbc.m802450200
[6] R. Anantha, E. Sokolova, & J. Borowiec, Rpa phosphorylation facilitates mitotic exit in response to mitotic dna damage, Proceedings of the National Academy of Sciences, vol. 105, no. 35, p. 12903-12908, 2008. https://doi.org/10.1073/pnas.0803001105

Reconstitution

We recommend that this vial be briefly centrifuged prior to opening to bring the contents to the bottom. Please reconstitute protein in deionized sterile water to a concentration of 0.1-1.0 mg/mL.We recommend to add 5-50% of glycerol (final concentration) and aliquot for long-term storage at -20°C/-80°C. Our default final concentration of glycerol is 50%. Customers could use it as reference.