1. Phylogeny  
   RSK1 (ribosomal protein S6 kinase alpha‑1; gene RPS6KA1) is phylogenetically classified as a member of the p90 ribosomal S6 kinase family, which is a subfamily of the MAPK‑activated protein kinases within the broader AGC kinase superfamily. Orthologs of RSK1 have been identified in all mammalian species and are conserved in a range of vertebrates, while similar dual‑kinase domain proteins have been observed in invertebrates as well, reflecting conservation from early metazoans. RSK1 is one of four closely related isoforms (RSK1–RSK4) that emerged via gene duplication events from a common ancestral kinase. Comparative analyses indicate that RSK1 shares significant amino acid sequence and structural homology with RSK2, RSK3, and RSK4, although each isoform contains distinct regulatory elements that contribute to their tissue‑specific expression and functional divergence (anjum2008therskfamily pages 2-4, cargnello2011activationandfunction pages 12-13, lara2013thep90rsk pages 1-2). In relation to other AGC kinases—such as protein kinase A (PKA), protein kinase B (AKT), and ribosomal S6 kinase (S6K)—RSK1 forms part of an evolutionarily preserved core of signaling enzymes that emerged early in eukaryotic evolution. Phylogenetic studies based on kinase domain conservation have placed RSK1 alongside these kinases, highlighting its fundamental role in transducing extracellular signals via the Ras–ERK pathway (romeo2012regulationandfunction pages 2-4, ikuta2007crystalstructuresof pages 1-2).
2. Reaction Catalyzed  
   RSK1 functions as a serine/threonine kinase that catalyzes phosphorylation reactions using ATP as the phosphate donor. In its catalytic cycle, RSK1 transfers the terminal phosphate group from ATP to the hydroxyl group of serine or threonine residues on substrate proteins, thereby converting ATP to ADP. The overall chemical reaction can be represented as follows: ATP + [protein]–(L‑serine/threonine) → ADP + [protein]–(L‑serine/threonine)‑phosphate + H⁺ (anjum2008therskfamily pages 2-4, cargnello2011activationandfunction pages 17-18).
3. Cofactor Requirements  
   The kinase activity of RSK1 is dependent on divalent metal ions, with Mg²⁺ serving as the principal cofactor. Mg²⁺ is essential for proper binding and orientation of ATP within the kinase active site, facilitating the phosphoryl transfer that is critical to catalysis. Without Mg²⁺, the conformation of the ATP binding pocket would be suboptimal and enzymatic activity would be greatly diminished (ikuta2007crystalstructuresof pages 1-2, roskoski2012erk12mapkinases pages 10-11).
4. Substrate Specificity  
   RSK1 exhibits substrate specificity characterized by a preference for phosphorylating serine residues within substrate motifs that typically contain basic amino acids. Peptide library and mutagenesis studies indicate that RSK1 recognizes sequences with a consensus motif resembling Arg/Lys‑X₁‑Arg‑X₂‑X₃‑pSer/Thr, where basic residues at upstream positions (commonly at the −3 and −5 relative to the phosphorylated residue) are critical for efficient substrate recognition (nguyen2008targetingrskan pages 1-2, lara2013thep90rsk pages 4-5). In addition to this minimal consensus, RSK1 phosphorylates specific substrates including transcription factors and regulatory proteins that influence cell growth and survival. The diverse range of substrates targeted by RSK1 reflects its ability to integrate extracellular signals into precise changes in protein phosphorylation (romeo2012regulationandfunction pages 9-10, anjum2008therskfamily pages 2-4).
5. Structure  
   RSK1 is organized into two distinct kinase domains arranged sequentially along a single polypeptide chain. The N‑terminal kinase domain (NTKD) is structurally homologous to the catalytic domains of cyclic AMP–dependent kinases such as PKA; it is principally responsible for substrate phosphorylation. The C‑terminal kinase domain (CTKD), more closely related to calcium/calmodulin‑dependent kinases (CAMK), plays a regulatory role by facilitating autophosphorylation events essential for full activation of the NTKD. These two domains are connected by a regulatory linker region that contains several key phosphorylation sites and docking motifs for upstream kinases, including an ERK‑docking domain that mediates interaction with ERK1/2 (ikuta2007crystalstructuresof pages 2-3, cargnello2011activationandfunction pages 13-15).  
   Crystal structure studies of the NTKD have revealed the canonical bilobal structure with a smaller N‑terminal lobe formed primarily by β‑sheets and a larger C‑terminal lobe dominated by α‑helices; the active site is located at the interface of these lobes and is lined by conserved residues essential for ATP binding and catalysis. Key structural features include the activation loop—which undergoes a conformational change upon phosphorylation—and the α‑C helix, which helps to stabilize the active conformation of the kinase. In addition, the ATP‑binding pocket is defined by residues that contribute to distinct inhibitor binding modes, as evidenced by crystallographic studies with various ATP‑competitive inhibitors (ikuta2007crystalstructuresof pages 7-9, lee2007p90ribosomals6 pages 1-3, romeo2012regulationandfunction pages 8-9). These unique structural attributes have provided a foundation for structure‑based drug design aimed at selectively inhibiting RSK1 activity.
6. Regulation  
   RSK1 regulation occurs primarily through a sequential phosphorylation cascade initiated by extracellular signal‑regulated kinases (ERK1/2). Upon mitogenic or stress-induced stimulation, ERK1/2 bind to a docking site located in the C‑terminal region of RSK1 and phosphorylate key residues in the CTKD, notably at Thr573. This phosphorylation event triggers autophosphorylation within the linker region, including phosphorylation at Ser380, which in turn creates a docking site for phosphoinositide‑dependent kinase 1 (PDK1). PDK1 then phosphorylates the NTKD at Ser221, an essential step for achieving full enzymatic activation (cargnello2011activationandfunction pages 17-18, anjum2008therskfamily pages 4-4).  
   Additional phosphorylation events include modifications at residues such as Ser363 and autophosphorylation events that may contribute to conformational stabilization and attenuation of ERK binding, thereby serving as a negative feedback mechanism. Regulatory phosphatases such as PP2C are also implicated in the deactivation of RSK1 by reversing these phosphorylation events. Furthermore, RSK1 regulation is influenced by changes in subcellular localization; inactive RSK1 is distributed in both the cytoplasm and nucleus, whereas upon activation it transiently associates with the plasma membrane before accumulating in the nucleus to phosphorylate its substrates (romeo2012regulationandfunction pages 5-7, ikuta2007crystalstructuresof pages 9-10).
7. Function  
   RSK1 plays a central role in relaying signals from the cell surface to the nucleus, thereby regulating diverse cellular processes. As a serine/threonine protein kinase, RSK1 phosphorylates multiple substrates that span functions in transcriptional regulation, protein synthesis, cell survival, proliferation, and differentiation. In fibroblasts, RSK1 is required for EGF‑stimulated phosphorylation of the transcription factor CREB1, which leads to the transcriptional activation of several immediate‑early genes; this establishes a critical link between growth factor stimulation and gene expression (anjum2008therskfamily pages 2-4, cargnello2011activationandfunction pages 17-18).  
   RSK1 is also involved in regulating translation through phosphorylation of ribosomal protein S6 and eukaryotic initiation factor 4B (EIF4B), thereby modulating cap‑dependent protein synthesis in response to mitogenic stimuli. In addition, RSK1 phosphorylates pro‑apoptotic proteins such as BAD and DAPK1; phosphorylation of these substrates inhibits their apoptotic function and consequently promotes cell survival (anjum2008therskfamily pages 4-4, romeo2012regulationandfunction pages 11-12).  
   Beyond its roles in transcription and translation, RSK1 modulates key components of the mTOR signaling pathway, influencing cell growth and metabolism. It also phosphorylates regulatory proteins that control cell cycle progression, thereby linking extracellular signals to cell division and differentiation. Through these multiple downstream effectors, RSK1 integrates extracellular cues from growth factors and stress signals into coordinated cellular responses, supporting processes such as proliferation and survival (anjum2008therskfamily pages 2-4, cargnello2011activationandfunction pages 17-18, lara2013thep90rsk pages 5-6).
8. Other Comments  
   Several small molecule inhibitors have been developed to target RSK1 and its isoforms in experimental settings. Inhibitors such as SL0101, BI‑D1870, and FMK act as ATP‑competitive or irreversible inhibitors that have been used to dissect the biological roles of RSK1 and to assess its potential as a therapeutic target in oncogenic signaling. Selective inhibitors—some of which exhibit higher potency against RSK1 relative to other isoforms—highlight the opportunity for isoform‑specific drug development (sapkota2007bid1870isa pages 1-2, nguyen2008targetingrskan pages 6-6, mayer2021rsk1vs.rsk2 pages 8-10).  
   Dysregulation of RSK1 activity has been associated with various types of human cancers. Elevated RSK1 activity contributes to enhanced cell proliferation, survival, migration, and invasion due to its role in phosphorylating transcription factors and regulators of translation. Although mutations directly affecting RSK1 have not been as clearly defined as those in RSK2—which is implicated in Coffin–Lowry syndrome—the aberrant overexpression and hyperactivation of RSK1 in tumors underscore its importance in oncogenic signaling pathways (romeo2012regulationandfunction pages 9-10, anjum2008therskfamily pages 2-4).  
   The integration of upstream signals via ERK1/2 and PDK1 with downstream effects on transcriptional and translational regulators makes RSK1 a nodal point in multiple signaling cascades, thereby presenting opportunities not only for therapeutic inhibition in cancer but also for understanding the broader cellular stress responses. Structural studies of RSK1 further inform rational drug design by revealing unique conformational features in the kinase domains that can be exploited for selective inhibition (ikuta2007crystalstructuresof pages 7-9, gogl2019disorderedproteinkinase pages 10-11).
9. References
10. Anjum, R. and Blenis, J. “The rsk family of kinases: emerging roles in cellular signalling”, Nature Reviews Molecular Cell Biology, 9:747–758, Oct 2008. URL: https://doi.org/10.1038/nrm2509. (anjum2008therskfamily pages 2-4, pages 4-4, pages 1-2)
11. Cargnello, M. and Roux, P.P. “Activation and function of the mapks and their substrates, the mapk-activated protein kinases”, Microbiology and Molecular Biology Reviews, 75:50–83, Mar 2011. URL: https://doi.org/10.1128/mmbr.00031-10. (cargnello2011activationandfunction pages 10-12, pages 12-13, pages 13-15, pages 17-18, pages 15-16, pages 1-1)
12. Gao, X., Chaturvedi, D. and Patel, T.B. “Localization and retention of p90 ribosomal s6 kinase 1 in the nucleus: implications for its function”, Molecular Biology of the Cell, 23:503–515, Feb 2012. URL: https://doi.org/10.1091/mbc.e11-07-0658. (gao2012localizationandretention pages 13-13)
13. Ikuta, M., Kornienko, M., Byrne, N., Reid, J.C., Mizuarai, S., Kotani, H. and Munshi, S.K. “Crystal structures of the n‑terminal kinase domain of human rsk1 bound to three different ligands: implications for the design of rsk1 specific inhibitors”, Protein Science, 16:2626–2635, Dec 2007. URL: https://doi.org/10.1110/ps.073123707. (ikuta2007crystalstructuresof pages 1-2, pages 10-10, pages 2-3, pages 7-9, pages 9-10)
14. Lara, R., Seckl, M.J. and Pardo, O. “The p90 rsk family members: common functions and isoform specificity”, Cancer Research, 73:5301–5308, Sep 2013. URL: https://doi.org/10.1158/0008-5472.can-12-4448. (lara2013thep90rsk pages 1-2, pages 2-4, pages 4-5, pages 5-6, pages 7-8)
15. Lee, K.Y., Bignone, P.A. and Ganesan, T.S. “P90 ribosomal s6 kinases‐ eclectic members of the human kinome”, Signal Transduction, 7:225–239, Jun 2007. URL: https://doi.org/10.1002/sita.200600091. (lee2007p90ribosomals6 pages 1-3, pages 3-5, pages 5-6, pages 8-9, pages 10-12, pages 15-15)
16. Nguyen, T.L. “Targeting rsk: an overview of small molecule inhibitors”, Anti‑Cancer Agents in Medicinal Chemistry, 8:710–716, Oct 2008. URL: https://doi.org/10.2174/187152008785914770. (nguyen2008targetingrskan pages 1-2, pages 6-6)
17. Poomakkoth, N., Issa, A., Abdulrahman, N., Gamal Abdelaziz, S. and Mraiche, F. “P90 ribosomal s6 kinase: a potential therapeutic target in lung cancer”, Journal of Translational Medicine, Jan 2016. URL: https://doi.org/10.1186/s12967-016-0768-1. (poomakkoth2016p90ribosomals6 pages 2-4)
18. Romeo, Y., Zhang, X. and Roux, P.P. “Regulation and function of the rsk family of protein kinases”, Biochemical Journal, 441:553–569, Dec 2012. URL: https://doi.org/10.1042/bj20110289. (romeo2012regulationandfunction pages 1-2, pages 2-4, pages 5-7, pages 7-8, pages 8-9, pages 9-10, pages 10-11, pages 12-13, pages 13-14, pages 11-12)
19. Roskoski, R. “Erk1/2 map kinases: structure, function, and regulation”, Pharmacological Research, 66:105–143, Aug 2012. URL: https://doi.org/10.1016/j.phrs.2012.04.005. (roskoski2012erk12mapkinases pages 10-11)
20. Roux, P.P., Richards, S.A. and Blenis, J. “Phosphorylation of p90 ribosomal s6 kinase (rsk) regulates extracellular signal‑regulated kinase docking and rsk activity”, Molecular and Cellular Biology, 23:4796–4804, Jul 2003. URL: https://doi.org/10.1128/mcb.23.14.4796-4804.2003. (roux2003phosphorylationofp90 pages 9-9)
21. Sapkota, G.P., Cummings, L., Newell, F., Armstrong, C., Bain, J., Frodin, M., Grauert, M., Hoffmann, M., Schnapp, G., Steegmaier, M., Cohen, P. and Alessi, D. “Bi‑D1870 is a specific inhibitor of the p90 rsk (ribosomal s6 kinase) isoforms in vitro and in vivo”, The Biochemical Journal, 401:29–38, 2007. URL: https://doi.org/10.1042/bj20061088. (sapkota2007bid1870isa pages 1-2)
22. Smith, J.A., Poteet‑Smith, C.E., Xu, Y., Errington, T.M., Hecht, S.M. and Lannigan, D.A. “Identification of the first specific inhibitor of p90 ribosomal s6 kinase (rsk) reveals an unexpected role for rsk in cancer cell proliferation”, Cancer Research, 65:1027–1034, Feb 2005. URL: https://doi.org/10.1158/0008-5472.1027.65.3. (smith2005identificationofthe pages 1-1)
23. Somale, D., Di Nardo, G., di Blasio, L., Puliafito, A., Vara‑Messler, M., Chiaverina, G., Palmiero, M., Monica, V., Gilardi, G., Primo, L. and Gagliardi, P.A. “Activation of rsk by phosphomimetic substitution in the activation loop is prevented by structural constraints”, Scientific Reports, Jan 2020. URL: https://doi.org/10.1038/s41598-019-56937-3. (somale2020activationofrsk pages 13-14)
24. Thiriet, M. “Cytoplasmic protein serine/threonine kinases”, in Biomathematical and Biomechanical Modeling of the Circulatory and Ventilatory Systems, pp. 175–310, Jul 2013. URL: https://doi.org/10.1007/978-1-4614-4370-4\_5. (thiriet2013cytoplasmicproteinserinethreonine pages 57-60, pages 60-63, pages 63-66)
25. Utepbergenov, D., Derewenda, U., Olekhnovich, N., Szukalska, G., Banerjee, B., Hilinski, M.K., Lannigan, D.A., Stukenberg, P.T. and Derewenda, Z.S. “Insights into the inhibition of the p90 ribosomal s6 kinase (rsk) by the flavonol glycoside sl0101 from the 1.5 Å crystal structure of the n‑terminal domain of rsk2 with bound inhibitor”, Biochemistry, 51:6499–6510, Aug 2012. URL: https://doi.org/10.1021/bi300620c. (utepbergenov2012insightsintothe pages 11-13)
26. Wright, E.B. and Lannigan, D.A. “Therapeutic targeting of p90 ribosomal s6 kinase”, Frontiers in Cell and Developmental Biology, Dec 2023. URL: https://doi.org/10.3389/fcell.2023.1297292. (wright2023therapeutictargetingof pages 1-3, pages 3-4)
27. Gógl, G., Kornev, A.P., Reményi, A. and Taylor, S.S. “Disordered protein kinase regions in regulation of kinase domain cores”, Trends in Biochemical Sciences, 44:300–311, Apr 2019. URL: https://doi.org/10.1016/j.tibs.2018.12.002. (gogl2019disorderedproteinkinase pages 10-11)
28. Kurinov, I. “Structural diversity of the active conformation of the n‑terminal kinase domain of p90 ribosomal s6 kinase 2”, Worldwide Protein Data Bank, Feb 2009. URL: https://doi.org/10.2210/pdb3g51/pdb. (kurinov2009structuraldiversityof pages 10-10)
29. Mayer, A., Hall, M.L., Lach, J., Clifford, J., Chandrasena, K., Canton, C., Kontoyianni, M., Choo, Y., Karan, D. and Hamann, M. “Rsk1 vs. rsk2 inhibitory activity of the marine β‑carboline alkaloid manzamine a: a biochemical, cervical cancer protein expression, and computational study”, Marine Drugs, Sep 2021. URL: https://doi.org/10.3390/md19090506. (mayer2021rsk1vs.rsk2 pages 8-10)

References

1. (anjum2008therskfamily pages 2-4): Rana Anjum and John Blenis. The rsk family of kinases: emerging roles in cellular signalling. Nature Reviews Molecular Cell Biology, 9:747-758, Oct 2008. URL: https://doi.org/10.1038/nrm2509, doi:10.1038/nrm2509. This article has 964 citations and is from a domain leading peer-reviewed journal.
2. (anjum2008therskfamily pages 4-4): Rana Anjum and John Blenis. The rsk family of kinases: emerging roles in cellular signalling. Nature Reviews Molecular Cell Biology, 9:747-758, Oct 2008. URL: https://doi.org/10.1038/nrm2509, doi:10.1038/nrm2509. This article has 964 citations and is from a domain leading peer-reviewed journal.
3. (cargnello2011activationandfunction pages 10-12): Marie Cargnello and Philippe P. Roux. Activation and function of the mapks and their substrates, the mapk-activated protein kinases. Microbiology and Molecular Biology Reviews, 75:50-83, Mar 2011. URL: https://doi.org/10.1128/mmbr.00031-10, doi:10.1128/mmbr.00031-10. This article has 4026 citations and is from a domain leading peer-reviewed journal.
4. (cargnello2011activationandfunction pages 12-13): Marie Cargnello and Philippe P. Roux. Activation and function of the mapks and their substrates, the mapk-activated protein kinases. Microbiology and Molecular Biology Reviews, 75:50-83, Mar 2011. URL: https://doi.org/10.1128/mmbr.00031-10, doi:10.1128/mmbr.00031-10. This article has 4026 citations and is from a domain leading peer-reviewed journal.
5. (cargnello2011activationandfunction pages 13-15): Marie Cargnello and Philippe P. Roux. Activation and function of the mapks and their substrates, the mapk-activated protein kinases. Microbiology and Molecular Biology Reviews, 75:50-83, Mar 2011. URL: https://doi.org/10.1128/mmbr.00031-10, doi:10.1128/mmbr.00031-10. This article has 4026 citations and is from a domain leading peer-reviewed journal.
6. (cargnello2011activationandfunction pages 17-18): Marie Cargnello and Philippe P. Roux. Activation and function of the mapks and their substrates, the mapk-activated protein kinases. Microbiology and Molecular Biology Reviews, 75:50-83, Mar 2011. URL: https://doi.org/10.1128/mmbr.00031-10, doi:10.1128/mmbr.00031-10. This article has 4026 citations and is from a domain leading peer-reviewed journal.
7. (gao2012localizationandretention pages 13-13): Xianlong Gao, Deepti Chaturvedi, and Tarun B. Patel. Localization and retention of p90 ribosomal s6 kinase 1 in the nucleus: implications for its function. Molecular Biology of the Cell, 23:503-515, Feb 2012. URL: https://doi.org/10.1091/mbc.e11-07-0658, doi:10.1091/mbc.e11-07-0658. This article has 32 citations and is from a domain leading peer-reviewed journal.
8. (ikuta2007crystalstructuresof pages 1-2): Mari Ikuta, Maria Kornienko, Noel Byrne, John C. Reid, Shinji Mizuarai, Hidehito Kotani, and Sanjeev K. Munshi. Crystal structures of the n‐terminal kinase domain of human rsk1 bound to three different ligands: implications for the design of rsk1 specific inhibitors. Protein Science, 16:2626-2635, Dec 2007. URL: https://doi.org/10.1110/ps.073123707, doi:10.1110/ps.073123707. This article has 55 citations and is from a peer-reviewed journal.
9. (ikuta2007crystalstructuresof pages 2-3): Mari Ikuta, Maria Kornienko, Noel Byrne, John C. Reid, Shinji Mizuarai, Hidehito Kotani, and Sanjeev K. Munshi. Crystal structures of the n‐terminal kinase domain of human rsk1 bound to three different ligands: implications for the design of rsk1 specific inhibitors. Protein Science, 16:2626-2635, Dec 2007. URL: https://doi.org/10.1110/ps.073123707, doi:10.1110/ps.073123707. This article has 55 citations and is from a peer-reviewed journal.
10. (ikuta2007crystalstructuresof pages 7-9): Mari Ikuta, Maria Kornienko, Noel Byrne, John C. Reid, Shinji Mizuarai, Hidehito Kotani, and Sanjeev K. Munshi. Crystal structures of the n‐terminal kinase domain of human rsk1 bound to three different ligands: implications for the design of rsk1 specific inhibitors. Protein Science, 16:2626-2635, Dec 2007. URL: https://doi.org/10.1110/ps.073123707, doi:10.1110/ps.073123707. This article has 55 citations and is from a peer-reviewed journal.
11. (ikuta2007crystalstructuresof pages 9-10): Mari Ikuta, Maria Kornienko, Noel Byrne, John C. Reid, Shinji Mizuarai, Hidehito Kotani, and Sanjeev K. Munshi. Crystal structures of the n‐terminal kinase domain of human rsk1 bound to three different ligands: implications for the design of rsk1 specific inhibitors. Protein Science, 16:2626-2635, Dec 2007. URL: https://doi.org/10.1110/ps.073123707, doi:10.1110/ps.073123707. This article has 55 citations and is from a peer-reviewed journal.
12. (lee2007p90ribosomals6 pages 1-3): Kwok Y. Lee, Paola A. Bignone, and Trivadi S. Ganesan. P90 ribosomal s6 kinases‐ eclectic members of the human kinome. Signal Transduction, 7:225-239, Jun 2007. URL: https://doi.org/10.1002/sita.200600091, doi:10.1002/sita.200600091. This article has 4 citations and is from a peer-reviewed journal.
13. (nguyen2008targetingrskan pages 1-2): TL Nguyen. Targeting rsk: an overview of small molecule inhibitors. Anti-Cancer Agents in Medicinal Chemistry, 8:710-716, Oct 2008. URL: https://doi.org/10.2174/187152008785914770, doi:10.2174/187152008785914770. This article has 101 citations and is from a peer-reviewed journal.
14. (nguyen2008targetingrskan pages 6-6): TL Nguyen. Targeting rsk: an overview of small molecule inhibitors. Anti-Cancer Agents in Medicinal Chemistry, 8:710-716, Oct 2008. URL: https://doi.org/10.2174/187152008785914770, doi:10.2174/187152008785914770. This article has 101 citations and is from a peer-reviewed journal.
15. (poomakkoth2016p90ribosomals6 pages 2-4): Noufira Poomakkoth, Aya Issa, Nabeel Abdulrahman, Somaia Gamal Abdelaziz, and Fatima Mraiche. P90 ribosomal s6 kinase: a potential therapeutic target in lung cancer. Journal of Translational Medicine, Jan 2016. URL: https://doi.org/10.1186/s12967-016-0768-1, doi:10.1186/s12967-016-0768-1. This article has 45 citations and is from a peer-reviewed journal.
16. (romeo2012regulationandfunction pages 2-4): Yves Romeo, Xiaocui Zhang, and Philippe P. Roux. Regulation and function of the rsk family of protein kinases. Biochemical Journal, 441:553-569, Dec 2012. URL: https://doi.org/10.1042/bj20110289, doi:10.1042/bj20110289. This article has 454 citations and is from a domain leading peer-reviewed journal.
17. (romeo2012regulationandfunction pages 5-7): Yves Romeo, Xiaocui Zhang, and Philippe P. Roux. Regulation and function of the rsk family of protein kinases. Biochemical Journal, 441:553-569, Dec 2012. URL: https://doi.org/10.1042/bj20110289, doi:10.1042/bj20110289. This article has 454 citations and is from a domain leading peer-reviewed journal.
18. (romeo2012regulationandfunction pages 8-9): Yves Romeo, Xiaocui Zhang, and Philippe P. Roux. Regulation and function of the rsk family of protein kinases. Biochemical Journal, 441:553-569, Dec 2012. URL: https://doi.org/10.1042/bj20110289, doi:10.1042/bj20110289. This article has 454 citations and is from a domain leading peer-reviewed journal.
19. (romeo2012regulationandfunction pages 9-10): Yves Romeo, Xiaocui Zhang, and Philippe P. Roux. Regulation and function of the rsk family of protein kinases. Biochemical Journal, 441:553-569, Dec 2012. URL: https://doi.org/10.1042/bj20110289, doi:10.1042/bj20110289. This article has 454 citations and is from a domain leading peer-reviewed journal.
20. (roskoski2012erk12mapkinases pages 10-11): Robert Roskoski. Erk1/2 map kinases: structure, function, and regulation. Pharmacological Research, 66:105-143, Aug 2012. URL: https://doi.org/10.1016/j.phrs.2012.04.005, doi:10.1016/j.phrs.2012.04.005. This article has 2094 citations and is from a highest quality peer-reviewed journal.
21. (roux2003phosphorylationofp90 pages 9-9): Philippe P. Roux, Stephanie A. Richards, and John Blenis. Phosphorylation of p90 ribosomal s6 kinase (rsk) regulates extracellular signal-regulated kinase docking and rsk activity. Molecular and Cellular Biology, 23:4796-4804, Jul 2003. URL: https://doi.org/10.1128/mcb.23.14.4796-4804.2003, doi:10.1128/mcb.23.14.4796-4804.2003. This article has 249 citations and is from a domain leading peer-reviewed journal.
22. (sapkota2007bid1870isa pages 1-2): Gopal P. Sapkota, Lorna Cummings, F. Newell, C. Armstrong, J. Bain, M. Frodin, M. Grauert, M. Hoffmann, G. Schnapp, M. Steegmaier, P. Cohen, and D. Alessi. Bi-d1870 is a specific inhibitor of the p90 rsk (ribosomal s6 kinase) isoforms in vitro and in vivo. The Biochemical journal, 401 1:29-38, 2007. URL: https://doi.org/10.1042/bj20061088, doi:10.1042/bj20061088. This article has 364 citations.
23. (smith2005identificationofthe pages 1-1): Jeffrey A. Smith, Celeste E. Poteet-Smith, Yaming Xu, Timothy M. Errington, Sidney M. Hecht, and Deborah A. Lannigan. Identification of the first specific inhibitor of p90 ribosomal s6 kinase (rsk) reveals an unexpected role for rsk in cancer cell proliferation. Cancer Research, 65:1027-1034, Feb 2005. URL: https://doi.org/10.1158/0008-5472.1027.65.3, doi:10.1158/0008-5472.1027.65.3. This article has 351 citations and is from a highest quality peer-reviewed journal.
24. (somale2020activationofrsk pages 13-14): Desiana Somale, Giovanna Di Nardo, Laura di Blasio, Alberto Puliafito, Marianela Vara-Messler, Giulia Chiaverina, Miriam Palmiero, Valentina Monica, Gianfranco Gilardi, Luca Primo, and Paolo Armando Gagliardi. Activation of rsk by phosphomimetic substitution in the activation loop is prevented by structural constraints. Scientific Reports, Jan 2020. URL: https://doi.org/10.1038/s41598-019-56937-3, doi:10.1038/s41598-019-56937-3. This article has 23 citations and is from a poor quality or predatory journal.
25. (thiriet2013cytoplasmicproteinserinethreonine pages 57-60): M Thiriet M Thiriet. Cytoplasmic protein serine/threonine kinases. Biomathematical and Biomechanical Modeling of the Circulatory and Ventilatory Systems, pages 175-310, Jul 2013. URL: https://doi.org/10.1007/978-1-4614-4370-4\_5, doi:10.1007/978-1-4614-4370-4\_5. This article has 11 citations.
26. (utepbergenov2012insightsintothe pages 11-13): Darkhan Utepbergenov, Urszula Derewenda, Natalya Olekhnovich, Gabriela Szukalska, Budhaditya Banerjee, Michael K. Hilinski, Deborah A. Lannigan, P. Todd Stukenberg, and Zygmunt S. Derewenda. Insights into the inhibition of the p90 ribosomal s6 kinase (rsk) by the flavonol glycoside sl0101 from the 1.5 å crystal structure of the n-terminal domain of rsk2 with bound inhibitor. Biochemistry, 51 33:6499-510, Aug 2012. URL: https://doi.org/10.1021/bi300620c, doi:10.1021/bi300620c. This article has 59 citations and is from a peer-reviewed journal.
27. (wright2023therapeutictargetingof pages 1-3): Eric B. Wright and Deborah A. Lannigan. Therapeutic targeting of p90 ribosomal s6 kinase. Frontiers in Cell and Developmental Biology, Dec 2023. URL: https://doi.org/10.3389/fcell.2023.1297292, doi:10.3389/fcell.2023.1297292. This article has 11 citations and is from a peer-reviewed journal.
28. (gogl2019disorderedproteinkinase pages 10-11): Gergő Gógl, Alexandr P. Kornev, Attila Reményi, and Susan S. Taylor. Disordered protein kinase regions in regulation of kinase domain cores. Trends in Biochemical Sciences, 44:300-311, Apr 2019. URL: https://doi.org/10.1016/j.tibs.2018.12.002, doi:10.1016/j.tibs.2018.12.002. This article has 74 citations and is from a domain leading peer-reviewed journal.
29. (kurinov2009structuraldiversityof pages 10-10): I. Kurinov. Structural diversity of the active conformation of the n-terminal kinase domain of p90 ribosomal s6 kinase 2. Worldwide Protein Data Bank, Feb 2009. URL: https://doi.org/10.2210/pdb3g51/pdb, doi:10.2210/pdb3g51/pdb. This article has 39 citations.
30. (lara2013thep90rsk pages 1-2): Romain Lara, Michael J. Seckl, and Olivier E. Pardo. The p90 rsk family members: common functions and isoform specificity. Cancer Research, 73:5301-5308, Sep 2013. URL: https://doi.org/10.1158/0008-5472.can-12-4448, doi:10.1158/0008-5472.can-12-4448. This article has 138 citations and is from a highest quality peer-reviewed journal.
31. (lara2013thep90rsk pages 4-5): Romain Lara, Michael J. Seckl, and Olivier E. Pardo. The p90 rsk family members: common functions and isoform specificity. Cancer Research, 73:5301-5308, Sep 2013. URL: https://doi.org/10.1158/0008-5472.can-12-4448, doi:10.1158/0008-5472.can-12-4448. This article has 138 citations and is from a highest quality peer-reviewed journal.
32. (lara2013thep90rsk pages 5-6): Romain Lara, Michael J. Seckl, and Olivier E. Pardo. The p90 rsk family members: common functions and isoform specificity. Cancer Research, 73:5301-5308, Sep 2013. URL: https://doi.org/10.1158/0008-5472.can-12-4448, doi:10.1158/0008-5472.can-12-4448. This article has 138 citations and is from a highest quality peer-reviewed journal.
33. (mayer2021rsk1vs.rsk2 pages 8-10): A. Mayer, Mary L. Hall, J. Lach, J. Clifford, Kevin Chandrasena, Caitlin Canton, M. Kontoyianni, Y. Choo, D. Karan, and M. Hamann. Rsk1 vs. rsk2 inhibitory activity of the marine β-carboline alkaloid manzamine a: a biochemical, cervical cancer protein expression, and computational study. Marine Drugs, Sep 2021. URL: https://doi.org/10.3390/md19090506, doi:10.3390/md19090506. This article has 12 citations and is from a peer-reviewed journal.
34. (romeo2012regulationandfunction pages 1-2): Yves Romeo, Xiaocui Zhang, and Philippe P. Roux. Regulation and function of the rsk family of protein kinases. Biochemical Journal, 441:553-569, Dec 2012. URL: https://doi.org/10.1042/bj20110289, doi:10.1042/bj20110289. This article has 454 citations and is from a domain leading peer-reviewed journal.
35. (romeo2012regulationandfunction pages 11-12): Yves Romeo, Xiaocui Zhang, and Philippe P. Roux. Regulation and function of the rsk family of protein kinases. Biochemical Journal, 441:553-569, Dec 2012. URL: https://doi.org/10.1042/bj20110289, doi:10.1042/bj20110289. This article has 454 citations and is from a domain leading peer-reviewed journal.