1. Phylogeny  
   MAP3K14, conventionally known as NF‐κB–inducing kinase (NIK) or Serine/threonine‐protein kinase NIK (UniProt Q99558), belongs to the evolutionarily conserved MAP3K family of serine/threonine kinases that mediate downstream signaling in the NF‐κB pathway (lin1998moleculardeterminantsof pages 1-2, liu2012structureofthe pages 1-1). Orthologs of NIK are present across mammalian species and have been identified in several eukaryotic lineages, underscoring its ancient origin and central role in immune signaling (lin1998moleculardeterminantsof pages 1-2). Furthermore, comparative analysis places NIK in close evolutionary proximity to other MAP3K family members such as MEKK1, with both groups sharing similar catalytic and regulatory domain architectures (liu2012structureofthe pages 1-1, lin1998moleculardeterminantsof pages 1-2). Its conservation among species supports the notion that NIK is a critical component of immune surveillance and inflammatory responses, a hallmark of the evolution of signaling proteins from yeast to man (lin1998moleculardeterminantsof pages 1-2).
2. Reaction Catalyzed  
   NIK catalyzes a phosphorylation reaction in which the γ‐phosphate of ATP is transferred to specific serine and threonine residues on target substrate proteins, predominantly IκB kinase α (IKKα) (brightbill2018nfκbinducingkinase pages 1-2, brightbill2018nfκbinducingkinase pages 2-3). The overall chemical reaction can be summarized as follows: ATP + [protein]–(L‐serine/threonine) → ADP + [protein]–(L‐serine/threonine)‐phosphate + H⁺ (brightbill2018nfκbinducingkinase pages 1-2). This phosphorylation event is pivotal in promoting the proteolytic processing of the NF‐κB2 p100 precursor, thereby enabling the generation of the p52 subunit and subsequent activation of noncanonical NF‐κB signaling (brightbill2018nfκbinducingkinase pages 2-3).
3. Cofactor Requirements  
   The catalytic activity of NIK is dependent on divalent metal ions, with Mg²⁺ serving as an essential cofactor by coordinating with ATP in the active site (liu2012structureofthe pages 5-6). The presence of Mg²⁺ is critical for the stabilization of the nucleotide and for facilitating the efficient transfer of the phosphate group during the phosphorylation reaction (liu2012structureofthe pages 5-6).
4. Substrate Specificity  
   NIK exhibits substrate specificity primarily toward proteins involved in the noncanonical NF‐κB pathway, with IKKα being the principal substrate targeted for phosphorylation (brightbill2018nfκbinducingkinase pages 2-3). The kinase recognizes specific serine/threonine residues on IKKα, and phosphorylation at these sites results in the activation of IKKα, which in turn phosphorylates the NF‐κB2 p100 precursor to promote its processing into p52 (brightbill2018nfκbinducingkinase pages 2-3, guan2023functionsofmap3ks pages 5-7). Although a detailed consensus substrate motif for NIK has not been fully defined, current evidence indicates that its substrate recognition is determined by the specific three‐dimensional arrangement of critical residues within its kinase domain (brightbill2018nfκbinducingkinase pages 2-3, guan2023functionsofmap3ks pages 5-7).
5. Structure  
   NIK is a 947–amino acid protein that exhibits a modular domain organization, which is essential for its regulatory and catalytic functions (liu2012structureofthe pages 1-1, brightbill2018nfκbinducingkinase pages 1-2). The protein comprises an N‐terminal TRAF3‐binding domain (approximately residues 30–120), which mediates interactions with TRAF adaptor proteins that play a central role in its basal degradation (brightbill2018nfκbinducingkinase pages 1-2, lin1998moleculardeterminantsof pages 1-2). Following this is a negative regulatory domain spanning approximately residues 121–318; this region contains basic and proline‐rich motifs that modulate the enzymatic activity of NIK and serve to restrain its function under unstimulated conditions (brightbill2018nfκbinducingkinase pages 1-2, lin1998moleculardeterminantsof pages 3-4).

The catalytic domain, which is central to NIK’s kinase activity, encompasses roughly residues 390–660. Structural studies using crystallographic analysis of truncated constructs have revealed that this central kinase domain adopts a canonical two‐lobe configuration typical of serine/threonine kinases, with an N‐terminal lobe primarily composed of β‐strands and a C‐terminal lobe dominated by α‐helices (liu2012structureofthe pages 3-4, liu2012structureofthe pages 4-5). Within this domain, key catalytic residues such as Lysine 429, which is critical for ATP binding, and components of the conserved DFG (Asp-Phe-Gly) motif, including Asp 534, are positioned in an arrangement that supports catalysis (liu2012structureofthe pages 4-5, liu2012structureofthe pages 7-8). The activation loop, containing the crucial residue Thr559, is partially disordered yet functionally critical for maintaining catalytic proficiency (liu2012structureofthe pages 3-4, liu2012structureofthe pages 7-8).

Adjacent to the kinase domain, the C‐terminal noncatalytic region (residues 661–947) is essential for mediating protein–protein interactions with downstream substrates such as IKKα, as well as with regulatory proteins including the TRAF and cIAP family members (brightbill2018nfκbinducingkinase pages 1-2, lin1998moleculardeterminantsof pages 3-4). This region contributes not only to substrate recognition but also to signaling specificity, enabling NIK to function selectively in response to receptor‐mediated stimuli. Moreover, structural studies have documented that the kinase domain of NIK exhibits a constitutively active conformation in vitro, a feature that is maintained by an N‐terminal extension that supports the proper orientation of helix C and the formation of a functional catalytic pocket (liu2012structureofthe pages 8-10, liu2012structureofthe pages 8-8). The ATP–binding cleft is formed between the N‐ and C‐terminal lobes and is characterized by a narrow pocket that accommodates ATP through a network of hydrogen bonds with hinge region residues. In addition to the catalytic lysine (Lys429), residues such as Glu440 in the C‐helix are instrumental in maintaining the structural integrity of the active site (liu2012structureofthe pages 4-5). Unique to NIK, the presence of tertiary structural elements in regions flanking the kinase domain contributes to its regulation through oligomerization and potential interactions with membranes or other cellular components, as observed in some cellular contexts (jung2016nikmap3k14regulatesmitochondrial pages 1-3, liu2012structureofthe pages 7-8).

1. Regulation  
   The regulatory mechanisms controlling NIK activity are multifaceted and involve both post‐translational modifications and dynamic protein–protein interactions. Under basal conditions, NIK is maintained at very low levels via constitutive ubiquitin–mediated proteasomal degradation facilitated by a cytosolic complex that includes TRAF2, TRAF3, and cIAP1/2; this regulatory pathway ensures that noncanonical NF‐κB signaling remains quiescent in the absence of receptor stimulation (brightbill2018nfκbinducingkinase pages 1-2, pflug2020targetingnfκbinducingkinase pages 1-3). Following ligation of specific members of the TNF receptor superfamily—such as BAFF‐R, LTβR, CD40, and OX40—TRAF3 is targeted for degradation, resulting in the stabilization and accumulation of NIK (brightbill2018nfκbinducingkinase pages 1-2, pflug2020targetingnfκbinducingkinase pages 1-3).

Additional regulation is provided by a negative feedback mechanism in which IKKα, once activated by NIK, phosphorylates NIK on specific serine residues located in its C‐terminal region (notably Ser809, Ser812, and Ser815) (razani2010negativefeedbackin pages 16-19, razani2010negativefeedbackin pages 12-16). Phosphorylation at these residues initiates further ubiquitination and degradation of NIK, thereby limiting the amplitude and duration of noncanonical NF‐κB signaling (razani2010negativefeedbackin pages 16-19, razani2010negativefeedbackin pages 7-8). Notably, these phosphorylation events occur independently of the TRAF–cIAP–mediated degradation pathway, providing a second level of regulatory control (razani2010negativefeedbackin pages 7-8). In addition, key residues in the activation loop of the kinase domain, such as Thr559, have been shown to be critical for the catalytic activity of NIK; mutations at these sites abolish its ability to phosphorylate downstream targets without affecting its overall stability or binding to regulatory partners (lin1998moleculardeterminantsof pages 3-4, liu2012structureofthe pages 3-4). Collectively, these mechanisms ensure that NIK activity is tightly controlled in both resting and stimulated cells, thereby maintaining appropriate levels of noncanonical NF‐κB signaling (brightbill2018nfκbinducingkinase pages 1-2, razani2010negativefeedbackin pages 16-19).

1. Function  
   NIK serves as a pivotal mediator in the noncanonical NF‐κB signaling cascade by phosphorylating IKKα, which in turn phosphorylates the NF‐κB2 precursor p100 to promote its proteolytic processing into the active p52 form (brightbill2018nfκbinducingkinase pages 1-2, brightbill2018nfκbinducingkinase pages 2-3). Activation of this pathway results in the generation of p52/RelB transcription factor complexes that translocate into the nucleus to regulate the expression of genes involved in B‐cell survival, lymphoid organogenesis, and various immune responses (brightbill2018nfκbinducingkinase pages 1-2, pflug2020targetingnfκbinducingkinase pages 15-16). NIK functions downstream of several TNF receptor superfamily members, and its receptor–selective activation ensures that signaling is appropriately modulated in response to distinct extracellular cues (brightbill2018nfκbinducingkinase pages 1-2, pflug2020targetingnfκbinducingkinase pages 15-16). In addition, studies using RNA interference and genetic knockout models have demonstrated that loss of NIK function results in aberrant immune cell development, impaired lymphoid architecture, and diminished production of immunoglobulins, thereby underscoring its essential role in immune homeostasis (pflug2020targetingnfκbinducingkinase pages 15-16, razani2010negativefeedbackin pages 1-2). Beyond its established role in mediating noncanonical NF‐κB signaling, NIK is also linked to regulatory circuits that govern antiviral immunity and inflammatory gene expression, as evidenced by its involvement in p100 processing and the modulation of proinflammatory cytokine transcription in various cell types (guan2023functionsofmap3ks pages 2-4, jung2016nikmap3k14regulatesmitochondrial pages 1-3). The central position of NIK in these signaling networks renders it a critical node that integrates receptor‐derived commands to effect long‐term changes in gene expression associated with immune response and tissue homeostasis (brightbill2018nfκbinducingkinase pages 1-2, pflug2020targetingnfκbinducingkinase pages 15-16).
2. Other Comments  
   Selective inhibition of NIK has been achieved using small molecule inhibitors such as NIK SMI1, which exhibits high potency (with a reported Ki in the sub-nanomolar range and an IC₅₀ of approximately 23 nM) and marked selectivity over a broad kinome panel (brightbill2018nfκbinducingkinase pages 3-4). These inhibitors are of significant interest as potential therapeutic agents for the treatment of autoimmune diseases, inflammatory disorders, and certain cancers wherein aberrant noncanonical NF‐κB signaling is implicated (brightbill2018nfκbinducingkinase pages 3-4, pflug2020targetingnfκbinducingkinase pages 18-19). Furthermore, dysregulation of NIK—whether through genetic mutations, loss of TRAF–cIAP-mediated degradation, or defective IKKα-dependent negative feedback—has been associated with pathological conditions such as systemic lupus erythematosus, rheumatoid arthritis, and various hematological malignancies (razani2010negativefeedbackin pages 1-2, brightbill2018nfκbinducingkinase pages 1-2). NIK’s receptor-selective mode of action, whereby it differentially responds to specific TNF receptor superfamily ligands (including BAFF-R, CD40, and LTβR), also underscores its utility as a therapeutic target with the potential for minimizing off-target effects (brightbill2018nfκbinducingkinase pages 1-2, pflug2020targetingnfκbinducingkinase pages 15-16). Current efforts in drug discovery are focused on further elucidating the structural nuances of the NIK ATP-binding cleft and its regulatory interfaces, in order to design inhibitors with improved efficacy and selectivity (paul2018inhibitoryκbkinase(ikk) pages 12-14, liu2012structureofthe pages 8-10).
3. References
4. Brightbill, H. D., Suto, E., Blaquiere, N., Ramamoorthi, N., Sujatha‐Bhaskar, S., Gogol, E. B., Castanedo, G. M., Jackson, B. T., Kwon, Y. C., Haller, S., Lesch, J., Bents, K., Everett, C., Kohli, P. B., Linge, S., Christian, L., Barrett, K., Jaochico, A., Berezhkovskiy, L. M., Fan, P. W., Modrusan, Z., Veliz, K., Townsend, M. J., DeVoss, J., Johnson, A. R., Godemann, R., Lee, W. P., Austin, C. D., McKenzie, B. S., Hackney, J. A., Crawford, J. J., Staben, S. T. (2018). Nf-κb inducing kinase is a therapeutic target for systemic lupus erythematosus. Nature Communications, Jan 2018, pages 1-2. https://doi.org/10.1038/s41467-017-02672-0
5. Brightbill, H. D., Suto, E., Blaquiere, N., Ramamoorthi, N., Sujatha‐Bhaskar, S., et al. (2018). Nf-κb inducing kinase is a therapeutic target for systemic lupus erythematosus. Nature Communications, Jan 2018, pages 2-3. https://doi.org/10.1038/s41467-017-02672-0
6. Guan, J., Fan, Y.-M., Wang, S., & Zhou, F. (2023). Functions of map3ks in antiviral immunity. Immunologic Research, pages 2-4. https://doi.org/10.1007/s12026-023-09401-4
7. Guan, J., Fan, Y.-M., Wang, S., & Zhou, F. (2023). Functions of map3ks in antiviral immunity. Immunologic Research, pages 7-9. https://doi.org/10.1007/s12026-023-09401-4
8. Jung, J.-U., Ravi, S., Lee, D. W., McFadden, K., Kamradt, M. L., Toussaint, L. G., & Sitcheran, R. (2016). Nik/map3k14 regulates mitochondrial dynamics and trafficking to promote cell invasion. Current Biology, Dec 2016, pages 1-3. https://doi.org/10.1016/j.cub.2016.10.009
9. Liu, J., Sudom, A., Min, X., Cao, Z., Gao, X., Ayres, M., Lee, F., Cao, P., Johnstone, S., Plotnikova, O., Walker, N., Chen, G., & Wang, Z. (2012). Structure of the nuclear factor κb-inducing kinase (nik) kinase domain reveals a constitutively active conformation. Journal of Biological Chemistry, Aug 2012, pages 1-1. https://doi.org/10.1074/jbc.m112.366658
10. Liu, J., Sudom, A., Min, X., Cao, Z., Gao, X., Ayres, M., Lee, F., Cao, P., Johnstone, S., Plotnikova, O., Walker, N., Chen, G., & Wang, Z. (2012). Structure of the nuclear factor κb-inducing kinase (nik) kinase domain reveals a constitutively active conformation. Journal of Biological Chemistry, Aug 2012, pages 8-10. https://doi.org/10.1074/jbc.m112.366658
11. Liu, J., Sudom, A., Min, X., Cao, Z., Gao, X., Ayres, M., Lee, F., Cao, P., Johnstone, S., Plotnikova, O., Walker, N., Chen, G., & Wang, Z. (2012). Structure of the nuclear factor κb-inducing kinase (nik) kinase domain reveals a constitutively active conformation. Journal of Biological Chemistry, Aug 2012, pages 8-8. https://doi.org/10.1074/jbc.m112.366658
12. Paul, A., Edwards, J., Pepper, C., & Mackay, S. (2018). Inhibitory-κb kinase (ikk) α and nuclear factor-κb (nfκb)-inducing kinase (nik) as anti-cancer drug targets. Cells, Oct 2018, pages 1-3. https://doi.org/10.3390/cells7100176
13. Pflug, K. M., & Sitcheran, R. (2020). Targeting nf-κb-inducing kinase (nik) in immunity, inflammation, and cancer. International Journal of Molecular Sciences, Nov 2020, pages 1-3. https://doi.org/10.3390/ijms21228470
14. Pflug, K. M., & Sitcheran, R. (2020). Targeting nf-κb-inducing kinase (nik) in immunity, inflammation, and cancer. International Journal of Molecular Sciences, Nov 2020, pages 15-16. https://doi.org/10.3390/ijms21228470
15. Razani, B., Zarnegar, B., Ytterberg, A. J., Shiba, T., Dempsey, P. W., Ware, C. F., Loo, J. A., & Cheng, G. (2010). Negative feedback in noncanonical nf-κb signaling modulates nik stability through ikkα-mediated phosphorylation. Science Signaling, May 2010, pages 12-16. https://doi.org/10.1126/scisignal.2000778
16. Razani, B., Zarnegar, B., Ytterberg, A. J., Shiba, T., Dempsey, P. W., Ware, C. F., Loo, J. A., & Cheng, G. (2010). Negative feedback in noncanonical nf-κb signaling modulates nik stability through ikkα-mediated phosphorylation. Science Signaling, May 2010, pages 16-19. https://doi.org/10.1126/scisignal.2000778
17. Razani, B., Zarnegar, B., Ytterberg, A. J., Shiba, T., Dempsey, P. W., Ware, C. F., Loo, J. A., & Cheng, G. (2010). Negative feedback in noncanonical nf-κb signaling modulates nik stability through ikkα-mediated phosphorylation. Science Signaling, May 2010, pages 4-5. https://doi.org/10.1126/scisignal.2000778
18. Razani, B., Zarnegar, B., Ytterberg, A. J., Shiba, T., Dempsey, P. W., Ware, C. F., Loo, J. A., & Cheng, G. (2010). Negative feedback in noncanonical nf-κb signaling modulates nik stability through ikkα-mediated phosphorylation. Science Signaling, May 2010, pages 5-7. https://doi.org/10.1126/scisignal.2000778
19. Razani, B., Zarnegar, B., Ytterberg, A. J., Shiba, T., Dempsey, P. W., Ware, C. F., Loo, J. A., & Cheng, G. (2010). Negative feedback in noncanonical nf-κb signaling modulates nik stability through ikkα-mediated phosphorylation. Science Signaling, May 2010, pages 7-8. https://doi.org/10.1126/scisignal.2000778
20. Lin, X., Mu, Y., Cunningham, E. T., Marcu, K. B., Geleziunas, R., & Greene, W. C. (1998). Molecular determinants of nf-κb-inducing kinase action. Molecular and Cellular Biology, Oct 1998, pages 1-2. https://doi.org/10.1128/mcb.18.10.5899
21. Lin, X., Mu, Y., Cunningham, E. T., Marcu, K. B., Geleziunas, R., & Greene, W. C. (1998). Molecular determinants of nf-κb-inducing kinase action. Molecular and Cellular Biology, Oct 1998, pages 3-4. https://doi.org/10.1128/mcb.18.10.5899
22. Ninomiya-Tsuji, J., Kishimoto, K., Hiyama, A., Inoue, J.-I., Cao, Z., & Matsumoto, K. (1999). The kinase tak1 can activate the nik-iκb as well as the map kinase cascade in the il-1 signalling pathway. Nature, Mar 1999, pages 1-2. https://doi.org/10.1038/18465
23. Schulze-Osthoff, K., Ferrari, D., Riehemann, K., & Wesselborg, S. (1997). Regulation of nf-κb activation by map kinase cascades. Immunobiology, Dec 1997, pages 6-9. https://doi.org/10.1016/s0171-2985(97)80025-3
24. Xiong, Y., Torsoni, A., Wu, F., Shen, H., Liu, Y., Zhong, X., et al. (2018). Hepatic nf-kb-inducing kinase (nik) suppresses mouse liver regeneration in acute and chronic liver diseases. eLife, Aug 2018, page 18-18. https://doi.org/10.7554/elife.34152

References

1. (brightbill2018nfκbinducingkinase pages 1-2): Hans D. Brightbill, Eric Suto, Nicole Blaquiere, Nandhini Ramamoorthi, Swathi Sujatha-Bhaskar, Emily B. Gogol, Georgette M. Castanedo, Benjamin T. Jackson, Youngsu C. Kwon, Susan Haller, Justin Lesch, Karin Bents, Christine Everett, Pawan Bir Kohli, Sandra Linge, Laura Christian, Kathy Barrett, Allan Jaochico, Leonid M. Berezhkovskiy, Peter W. Fan, Zora Modrusan, Kelli Veliz, Michael J. Townsend, Jason DeVoss, Adam R. Johnson, Robert Godemann, Wyne P. Lee, Cary D. Austin, Brent S. McKenzie, Jason A. Hackney, James J. Crawford, Steven T. Staben, Moulay H. Alaoui Ismaili, Lawren C. Wu, and Nico Ghilardi. Nf-κb inducing kinase is a therapeutic target for systemic lupus erythematosus. Nature Communications, Jan 2018. URL: https://doi.org/10.1038/s41467-017-02672-0, doi:10.1038/s41467-017-02672-0. This article has 129 citations and is from a highest quality peer-reviewed journal.
2. (brightbill2018nfκbinducingkinase pages 2-3): Hans D. Brightbill, Eric Suto, Nicole Blaquiere, Nandhini Ramamoorthi, Swathi Sujatha-Bhaskar, Emily B. Gogol, Georgette M. Castanedo, Benjamin T. Jackson, Youngsu C. Kwon, Susan Haller, Justin Lesch, Karin Bents, Christine Everett, Pawan Bir Kohli, Sandra Linge, Laura Christian, Kathy Barrett, Allan Jaochico, Leonid M. Berezhkovskiy, Peter W. Fan, Zora Modrusan, Kelli Veliz, Michael J. Townsend, Jason DeVoss, Adam R. Johnson, Robert Godemann, Wyne P. Lee, Cary D. Austin, Brent S. McKenzie, Jason A. Hackney, James J. Crawford, Steven T. Staben, Moulay H. Alaoui Ismaili, Lawren C. Wu, and Nico Ghilardi. Nf-κb inducing kinase is a therapeutic target for systemic lupus erythematosus. Nature Communications, Jan 2018. URL: https://doi.org/10.1038/s41467-017-02672-0, doi:10.1038/s41467-017-02672-0. This article has 129 citations and is from a highest quality peer-reviewed journal.
3. (guan2023functionsofmap3ks pages 2-4): Jizhong Guan, Yao-min Fan, Shuai Wang, and Fangfang Zhou. Functions of map3ks in antiviral immunity. Immunologic Research, 71:814-832, Jun 2023. URL: https://doi.org/10.1007/s12026-023-09401-4, doi:10.1007/s12026-023-09401-4. This article has 14 citations and is from a peer-reviewed journal.
4. (jung2016nikmap3k14regulatesmitochondrial pages 1-3): Ji-Ung Jung, Sowndharya Ravi, Dong W Lee, Kassandra McFadden, Michael L. Kamradt, L. G. Toussaint, and R. Sitcheran. Nik/map3k14 regulates mitochondrial dynamics and trafficking to promote cell invasion. Current Biology, 26:3288-3302, Dec 2016. URL: https://doi.org/10.1016/j.cub.2016.10.009, doi:10.1016/j.cub.2016.10.009. This article has 99 citations and is from a highest quality peer-reviewed journal.
5. (liu2012structureofthe pages 1-1): Jinsong Liu, Athena Sudom, Xiaoshan Min, Zhaodan Cao, Xiong Gao, Merrill Ayres, Fei Lee, Ping Cao, Sheree Johnstone, Olga Plotnikova, Nigel Walker, Guoqing Chen, and Zhulun Wang. Structure of the nuclear factor κb-inducing kinase (nik) kinase domain reveals a constitutively active conformation. Journal of Biological Chemistry, 287:27326-27334, Aug 2012. URL: https://doi.org/10.1074/jbc.m112.366658, doi:10.1074/jbc.m112.366658. This article has 77 citations and is from a domain leading peer-reviewed journal.
6. (liu2012structureofthe pages 8-10): Jinsong Liu, Athena Sudom, Xiaoshan Min, Zhaodan Cao, Xiong Gao, Merrill Ayres, Fei Lee, Ping Cao, Sheree Johnstone, Olga Plotnikova, Nigel Walker, Guoqing Chen, and Zhulun Wang. Structure of the nuclear factor κb-inducing kinase (nik) kinase domain reveals a constitutively active conformation. Journal of Biological Chemistry, 287:27326-27334, Aug 2012. URL: https://doi.org/10.1074/jbc.m112.366658, doi:10.1074/jbc.m112.366658. This article has 77 citations and is from a domain leading peer-reviewed journal.
7. (liu2012structureofthe pages 8-8): Jinsong Liu, Athena Sudom, Xiaoshan Min, Zhaodan Cao, Xiong Gao, Merrill Ayres, Fei Lee, Ping Cao, Sheree Johnstone, Olga Plotnikova, Nigel Walker, Guoqing Chen, and Zhulun Wang. Structure of the nuclear factor κb-inducing kinase (nik) kinase domain reveals a constitutively active conformation. Journal of Biological Chemistry, 287:27326-27334, Aug 2012. URL: https://doi.org/10.1074/jbc.m112.366658, doi:10.1074/jbc.m112.366658. This article has 77 citations and is from a domain leading peer-reviewed journal.
8. (pflug2020targetingnfκbinducingkinase pages 1-3): Kathryn M. Pflug and Raquel Sitcheran. Targeting nf-κb-inducing kinase (nik) in immunity, inflammation, and cancer. International Journal of Molecular Sciences, 21:8470, Nov 2020. URL: https://doi.org/10.3390/ijms21228470, doi:10.3390/ijms21228470. This article has 171 citations and is from a peer-reviewed journal.
9. (pflug2020targetingnfκbinducingkinase pages 15-16): Kathryn M. Pflug and Raquel Sitcheran. Targeting nf-κb-inducing kinase (nik) in immunity, inflammation, and cancer. International Journal of Molecular Sciences, 21:8470, Nov 2020. URL: https://doi.org/10.3390/ijms21228470, doi:10.3390/ijms21228470. This article has 171 citations and is from a peer-reviewed journal.
10. (pflug2020targetingnfκbinducingkinase pages 18-19): Kathryn M. Pflug and Raquel Sitcheran. Targeting nf-κb-inducing kinase (nik) in immunity, inflammation, and cancer. International Journal of Molecular Sciences, 21:8470, Nov 2020. URL: https://doi.org/10.3390/ijms21228470, doi:10.3390/ijms21228470. This article has 171 citations and is from a peer-reviewed journal.
11. (brightbill2018nfκbinducingkinase pages 3-4): Hans D. Brightbill, Eric Suto, Nicole Blaquiere, Nandhini Ramamoorthi, Swathi Sujatha-Bhaskar, Emily B. Gogol, Georgette M. Castanedo, Benjamin T. Jackson, Youngsu C. Kwon, Susan Haller, Justin Lesch, Karin Bents, Christine Everett, Pawan Bir Kohli, Sandra Linge, Laura Christian, Kathy Barrett, Allan Jaochico, Leonid M. Berezhkovskiy, Peter W. Fan, Zora Modrusan, Kelli Veliz, Michael J. Townsend, Jason DeVoss, Adam R. Johnson, Robert Godemann, Wyne P. Lee, Cary D. Austin, Brent S. McKenzie, Jason A. Hackney, James J. Crawford, Steven T. Staben, Moulay H. Alaoui Ismaili, Lawren C. Wu, and Nico Ghilardi. Nf-κb inducing kinase is a therapeutic target for systemic lupus erythematosus. Nature Communications, Jan 2018. URL: https://doi.org/10.1038/s41467-017-02672-0, doi:10.1038/s41467-017-02672-0. This article has 129 citations and is from a highest quality peer-reviewed journal.
12. (guan2023functionsofmap3ks pages 5-7): Jizhong Guan, Yao-min Fan, Shuai Wang, and Fangfang Zhou. Functions of map3ks in antiviral immunity. Immunologic Research, 71:814-832, Jun 2023. URL: https://doi.org/10.1007/s12026-023-09401-4, doi:10.1007/s12026-023-09401-4. This article has 14 citations and is from a peer-reviewed journal.
13. (lin1998moleculardeterminantsof pages 1-2): Xin Lin, Yajun Mu, Emmett T. Cunningham, Kenneth B. Marcu, Romas Geleziunas, and Warner C. Greene. Molecular determinants of nf-κb-inducing kinase action. Molecular and Cellular Biology, 18:5899-5907, Oct 1998. URL: https://doi.org/10.1128/mcb.18.10.5899, doi:10.1128/mcb.18.10.5899. This article has 195 citations and is from a domain leading peer-reviewed journal.
14. (lin1998moleculardeterminantsof pages 3-4): Xin Lin, Yajun Mu, Emmett T. Cunningham, Kenneth B. Marcu, Romas Geleziunas, and Warner C. Greene. Molecular determinants of nf-κb-inducing kinase action. Molecular and Cellular Biology, 18:5899-5907, Oct 1998. URL: https://doi.org/10.1128/mcb.18.10.5899, doi:10.1128/mcb.18.10.5899. This article has 195 citations and is from a domain leading peer-reviewed journal.
15. (liu2012structureofthe pages 3-4): Jinsong Liu, Athena Sudom, Xiaoshan Min, Zhaodan Cao, Xiong Gao, Merrill Ayres, Fei Lee, Ping Cao, Sheree Johnstone, Olga Plotnikova, Nigel Walker, Guoqing Chen, and Zhulun Wang. Structure of the nuclear factor κb-inducing kinase (nik) kinase domain reveals a constitutively active conformation. Journal of Biological Chemistry, 287:27326-27334, Aug 2012. URL: https://doi.org/10.1074/jbc.m112.366658, doi:10.1074/jbc.m112.366658. This article has 77 citations and is from a domain leading peer-reviewed journal.
16. (liu2012structureofthe pages 4-5): Jinsong Liu, Athena Sudom, Xiaoshan Min, Zhaodan Cao, Xiong Gao, Merrill Ayres, Fei Lee, Ping Cao, Sheree Johnstone, Olga Plotnikova, Nigel Walker, Guoqing Chen, and Zhulun Wang. Structure of the nuclear factor κb-inducing kinase (nik) kinase domain reveals a constitutively active conformation. Journal of Biological Chemistry, 287:27326-27334, Aug 2012. URL: https://doi.org/10.1074/jbc.m112.366658, doi:10.1074/jbc.m112.366658. This article has 77 citations and is from a domain leading peer-reviewed journal.
17. (liu2012structureofthe pages 5-6): Jinsong Liu, Athena Sudom, Xiaoshan Min, Zhaodan Cao, Xiong Gao, Merrill Ayres, Fei Lee, Ping Cao, Sheree Johnstone, Olga Plotnikova, Nigel Walker, Guoqing Chen, and Zhulun Wang. Structure of the nuclear factor κb-inducing kinase (nik) kinase domain reveals a constitutively active conformation. Journal of Biological Chemistry, 287:27326-27334, Aug 2012. URL: https://doi.org/10.1074/jbc.m112.366658, doi:10.1074/jbc.m112.366658. This article has 77 citations and is from a domain leading peer-reviewed journal.
18. (liu2012structureofthe pages 7-8): Jinsong Liu, Athena Sudom, Xiaoshan Min, Zhaodan Cao, Xiong Gao, Merrill Ayres, Fei Lee, Ping Cao, Sheree Johnstone, Olga Plotnikova, Nigel Walker, Guoqing Chen, and Zhulun Wang. Structure of the nuclear factor κb-inducing kinase (nik) kinase domain reveals a constitutively active conformation. Journal of Biological Chemistry, 287:27326-27334, Aug 2012. URL: https://doi.org/10.1074/jbc.m112.366658, doi:10.1074/jbc.m112.366658. This article has 77 citations and is from a domain leading peer-reviewed journal.
19. (paul2018inhibitoryκbkinase(ikk) pages 12-14): Andrew Paul, Joanne Edwards, Christopher Pepper, and Simon Mackay. Inhibitory-κb kinase (ikk) α and nuclear factor-κb (nfκb)-inducing kinase (nik) as anti-cancer drug targets. Cells, 7:176, Oct 2018. URL: https://doi.org/10.3390/cells7100176, doi:10.3390/cells7100176. This article has 84 citations and is from a peer-reviewed journal.
20. (razani2010negativefeedbackin pages 1-2): Bahram Razani, Brian Zarnegar, A. Jimmy Ytterberg, Travis Shiba, Paul W. Dempsey, Carl F. Ware, Joseph A. Loo, and Genhong Cheng. Negative feedback in noncanonical nf-κb signaling modulates nik stability through ikkα-mediated phosphorylation. Science Signaling, 3:ra41-ra41, May 2010. URL: https://doi.org/10.1126/scisignal.2000778, doi:10.1126/scisignal.2000778. This article has 168 citations and is from a domain leading peer-reviewed journal.
21. (razani2010negativefeedbackin pages 12-16): Bahram Razani, Brian Zarnegar, A. Jimmy Ytterberg, Travis Shiba, Paul W. Dempsey, Carl F. Ware, Joseph A. Loo, and Genhong Cheng. Negative feedback in noncanonical nf-κb signaling modulates nik stability through ikkα-mediated phosphorylation. Science Signaling, 3:ra41-ra41, May 2010. URL: https://doi.org/10.1126/scisignal.2000778, doi:10.1126/scisignal.2000778. This article has 168 citations and is from a domain leading peer-reviewed journal.
22. (razani2010negativefeedbackin pages 16-19): Bahram Razani, Brian Zarnegar, A. Jimmy Ytterberg, Travis Shiba, Paul W. Dempsey, Carl F. Ware, Joseph A. Loo, and Genhong Cheng. Negative feedback in noncanonical nf-κb signaling modulates nik stability through ikkα-mediated phosphorylation. Science Signaling, 3:ra41-ra41, May 2010. URL: https://doi.org/10.1126/scisignal.2000778, doi:10.1126/scisignal.2000778. This article has 168 citations and is from a domain leading peer-reviewed journal.
23. (razani2010negativefeedbackin pages 7-8): Bahram Razani, Brian Zarnegar, A. Jimmy Ytterberg, Travis Shiba, Paul W. Dempsey, Carl F. Ware, Joseph A. Loo, and Genhong Cheng. Negative feedback in noncanonical nf-κb signaling modulates nik stability through ikkα-mediated phosphorylation. Science Signaling, 3:ra41-ra41, May 2010. URL: https://doi.org/10.1126/scisignal.2000778, doi:10.1126/scisignal.2000778. This article has 168 citations and is from a domain leading peer-reviewed journal.