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NPM1 Monoclonal Antibody (FC-61991)

Catalog Number 32-5200

Product data sheet

Details	
Size	100 µg
Host/Isotope	Mouse / IgG1
Class	Monoclonal
Type	Antibody
Clone	FC-61991
Immunogen	NPM/B23 purified from rat hepatoma.
Conjugate	Unconjugated
Form	Liquid
Concentration	0.5 mg/mL
Purification	Protein A
Storage buffer	PBS, pH 7.4
Contains	0.1% sodium azide
Storage Conditions	-20°C

Species Reactivity	
Species reactivity	Human, Mouse, Rat
Published species	Virus, Non-human primate, Human, Mouse, Not Applicable

Tested Applications	Dilution *
ELISA (ELISA)	1-2 µg/mL
Immunohistochemistry (IHC)	Assay-dependent
Immunoprecipitation (IP)	10 µg
Western Blot (WB)	1-3 µg/mL
RNA Immunoprecipitation (RIP)	Assay-dependent
Immunocytochemistry (ICC/IF)	2-10 µg/mL

Published Applications	
Immunohistochemistry (IHC)	See 6 publications below
Immunocytochemistry (ICC/IF)	See 24 publications below
Western Blot (WB)	See 22 publications below
Miscellaneous PubMed (Misc)	See 19 publications below
Immunoprecipitation (IP)	See 3 publications below

* Suggested working dilutions are given as a guide only. It is recommended that the user titrate the product for use in their own experiment using appropriate negative and positive controls.

Product specific information

This antibody reacts with the C-terminus of Nucleophosmin (B23). Positive controls used: HeLa, K562, Jurkat, MCF-7, and HL60 cell lysates). In western blots the antibody recognizes a band at ~37 kDa.

Background/Target Information

NPM1 (Nucleophosmin 1, B23, nutramin, NO38) is a ubiquitously expressed phosphoprotein involved in ribosome assembly/transport, cytoplasmic /nuclear trafficking, regulation of DNA polymerase alpha activity, centrosome duplication, and regulation of p53. NPM1 continuously shuttles between the nucleus, cytoplasm, nucleolus and chaperoning core histones from the nucleus to the cytoplasm. NPM1 has been shown to bind nucleic acid, prevent protein aggregation via its chaperon activities, protect enzymes during thermal denaturation, and facilitate renaturation of chemically denatured proteins. In its cellular structure role, there is evidence suggesting NPM1 is associated with the centrosome, and is the substrate of CDK2/cyclin E during duplication of centrosomes (cellular division). Due to the NPM1 gene interaction with several tumor-associated chromosome translocations, NPM1 is thought to be a portion of several fusion proteins: NPM-ALK, NPM-RAR, and NPM-MLF1. While it is not thought to be part of the transforming potential of these fusion proteins, NPM1 is believed to act as the interface for oligomerization and oncogenic conversion of these tumor promoting fusion proteins. Further, NPM1 is also known to sequester the tumor suppressor RF in the nucleolus, protecting it from degradation until it is necessary. Dysfunction of the NPM1 protein is associated with diseases such as acute myeloid leukemia and lymphomatoid papulosis.

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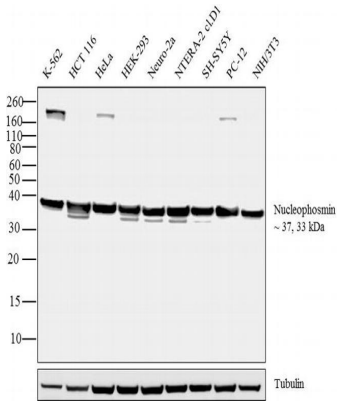
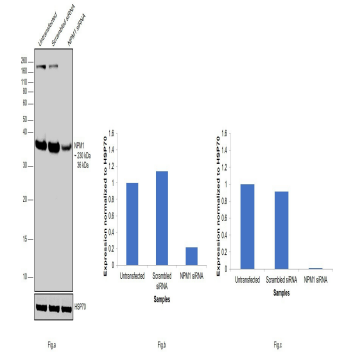
Product Images For NPM1 Monoclonal Antibody (FC-61991)



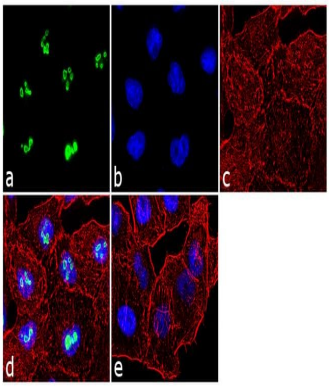
NPM1 Antibody (32-5200) in WB

Western blot analysis was performed on nuclear enriched cell extracts of K-562 (Lane 1), HCT 116 (Lane 2), HeLa (Lane 3), HEK-293 (Lane 4), Neuro-2a (Lane 5), NTERA-2 cl.D1 (Lane 6), SH-SY5Y (lane 7), PC-12 (lane 8) and NIH /3T3 (Lane 9). Blots were probed with Anti- Nucleophosmin Mouse Monoclonal Antibody (Product # 32-5200, 2 µg /mL) and detected by chemiluminescence using Goat anti-Mouse IgG (H+L) Superclonal™ Secondary Antibody, HRP conj µgate (Product # A28177, 0.4 µg/mL, 1:2500 dilution). A ~ 37 kDa band corresponding to Nucleophosmin was observed across all cell lines. An additional ~ 33 kDa band corresponding to Nucleophosmin isoform was observed in HCT 116 (Lane 2), HEK-293 (Lane 4), Neuro-2a (Lane 5), NTERA-2 cl.D1 (Lane 6) and SH-SY5Y (lane 7). Bands of ~210 kDa observed in K-562 (Lane 1), HeLa (Lane 3) and PC-12 (lane 8) could be due to oligomerisation of Nucleophosmin. Protein samples were electrophoresed using Novex® NuPAGE® 4-12 % Bis-Tris gel (Product # NP0321BOX), XCell SureLock™ Electrophoresis System (Product # EI0002) and Novex® Sharp Pre-Stained Protein Standard (Product # LC5800). Resolved proteins were transferred onto a nitrocellulose membrane and probed with the relevant primary and secondary Antibody following blocking with 5 % skimmed milk. Chemiluminescent detection was performed using Pierce™ ECL Western Blotting Substrate (Product # 32106).



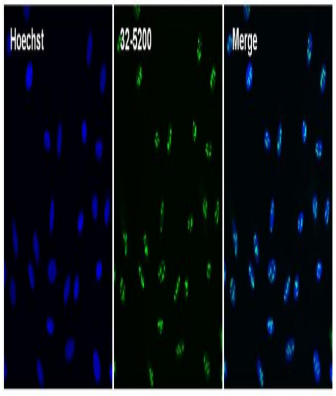
NPM1 Antibody (32-5200)

Antibody specificity was demonstrated by siRNA mediated knockdown of target protein. HeLa cells were transfected with NPM1 siRNA and decrease in signal intensity was observed in western blot application using Anti-NPM1 Monoclonal Antibody (FC-61991) (Product # 32-5200). {KD}



NPM1 Antibody (32-5200) in ICC/IF

Immunofluorescence analysis of Nucleophosmin was performed using 70% confluent log phase A549 cells. The cells were fixed with 4% paraformaldehyde for 10 minutes, permeabilized with 0.1% Triton™ X-100 for 10 minutes, and blocked with 1% BSA for 1 hour at room temperature. The cells were labeled with Nucleophosmin (FC-61991) Mouse Monoclonal Antibody (Product # 32-5200) at 2 µg/mL in 0.1% BSA and incubated for 3 hours at room temperature and then labeled with Goat anti-Mouse IgG (H+L) Superclonal™ Secondary Antibody, Alexa Fluor® 488 conj µgate (Product # A28175) at a dilution of 1:2000 for 45 minutes at room temperature (Panel a: green). Nuclei (Panel b: blue) were stained with SlowFade® Gold Antifade Mountant with DAPI (Product # S36938). F-actin (Panel c: red) was stained with Alexa Fluor® 555 Rhodamine Phalloidin (Product # R415, 1:300). Panel d represents the merged image showing nucleolar localization. Panel e shows the no primary antibody control. The images were captured at 60X magnification.



NPM1 Antibody (32-5200) in ICC/IF

Immunofluorescent analysis of Nucleophosmin (green) in HeLa cells. The cells were fixed with 4% paraformaldehyde for 15 minutes, permeabilized with 0.1% Triton X-100 in PBS for 15 minutes, and blocked with 3% Blocker BSA (Product # 37525) in PBS for 30 minutes at room temperature. Cells were stained with a Nucleophosmin monoclonal antibody (Product # 32-5200) at a concentration of 10 µg/mL for 1 hour at room temperature, and then incubated with a Goat anti-Mouse IgG (H+L) Superclonal Secondary Antibody, Alexa Fluor® 488 conjugate (Product # A28175) at a dilution of 1:1000 for 1 hour at room temperature (green). Nuclei (blue) were stained with Hoechst 33342 dye (Product # 62249). Images were taken on a Thermo Scientific ToxInsight at 20X magnification.

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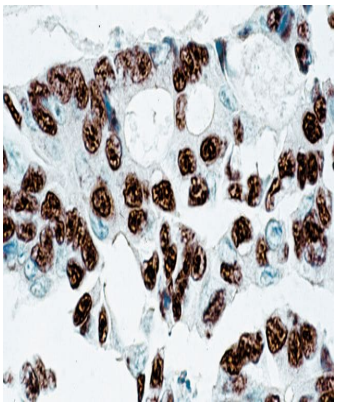
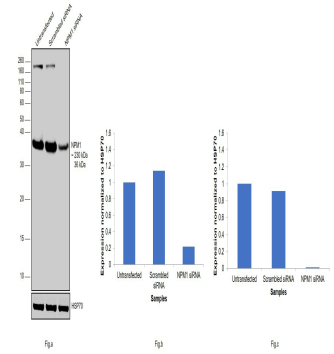


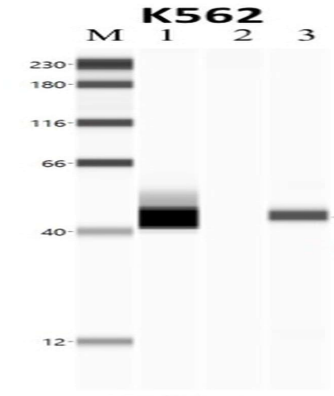
NPM1 Antibody (32-5200) in IHC

Immunohistochemical staining of human colon cancer tissue using Mouse anti-Nucleophosmin monoclonal antibody (clone FC-61991) (Product # 32-5200).



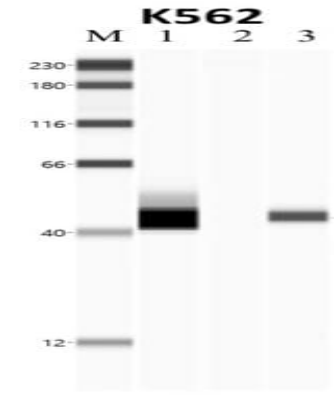
NPM1 Antibody (32-5200) in WB

Knockdown of NPM1 was achieved by transfecting HeLa with NPM1 specific siRNAs (Silencer® select Product # s9677, s9676). Western blot analysis (Fig. a) was performed using modified whole cell extracts (1% SDS) from the NPM1 knockdown cells (Lane 3), non-specific scrambled siRNA transfected cells (Lane 2) and untransfected cells (Lane 1). The blot was probed with NPM1 Monoclonal Antibody (FC-61991) (Product # 32-5200, 0.5 µg/mL) and Goat anti-Rabbit IgG (Heavy Chain), Superclonal™ Recombinant Secondary Antibody, HRP (Product # A27036, 1:4,000 dilution). Densitometric analysis of this western blot for the 36 kDa band is shown in Fig. b and for the 230 kDa band in Fig. c. Decrease in signal upon siRNA mediated knock down confirms that antibody is specific to NPM1.



NPM1 Antibody (32-5200) in IP

Immunoprecipitation of NPM1 was performed on K562 cells. Antigen-antibody complexes were formed by incubating approximately 500 µg whole cell lysate with 5 µg of NPM1 monoclonal antibody (Product # 325200) rotating 60 min at RT. The immune complexes were captured on 625 µg of anti-mouse coated Dynabeads (Product # 11202D) and washed extensively. They were then eluted and analyzed using the Jess Simple Western system. Lane 1 is input, lane 2 IP without antibody and lane 3 IP with antibody. Target was detected a NPM1 monoclonal antibody (Product # 325200) at a dilution of 1:25, followed by a 1:100 dilution of secondary antibody. Data courtesy of the Yeo lab as part of the ENCODE project (www.encodeproject.org).



NPM1 Antibody (32-5200) in RIP

RNA immunoprecipitation (RIP) western of NPM1 was performed on K562 cells. Antigen-antibody complexes were formed by incubating approximately 500 µg whole cell lysate with 5 µg of NPM1 monoclonal antibody (Product # 325200) rotating 60 min at RT. The immune complexes were captured on 625 µg of anti-mouse coated Dynabeads (Product # 11202D) and washed extensively. They were then eluted and analyzed using the Jess Simple Western system. Lane 1 is input, lane 2 IP without antibody and lane 3 IP with antibody. Target was detected a NPM1 monoclonal antibody (Product # 325200) at a dilution of 1:25, followed by a 1:100 dilution of secondary antibody. Data courtesy of the Yeo lab as part of the ENCODE project (www.encodeproject.org).

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PubMed References For NPM1 Monoclonal Antibody (FC-61991)

6 Immunohistochemistry References

Species / Dilution	Summary
Human / Not Cited	32-5200 was used in Immunohistochemistry-immunofluorescence to demonstrate that cancer cells respond to cisplatin treatment with the nucleolar accumulation of inorganic polyphosphate (polyP), a universally conserved high-energy compound. Frontiers in oncology (2021; 9:) **"Accumulation of Nucleolar Inorganic Polyphosphate Is a Cellular Response to Cisplatin-Induced Apoptosis."** Author(s):Xie L,Rajpurkar A,Quarles E,Taube N,Rai AS,Erba J,Sliwinski B,Markowitz M,Jakob U,Knoefler D PubMed Article URL:http://dx.doi.org/10.3389/fonc.2019.01410
Not Applicable / Not Cited	32-5200 was used in immunohistochemistry to review the transcription factors that the re-replication inhibitor Geminin binds BMC biochemistry (2009; 10:) **"TIPT2 and geminin interact with basal transcription factors to synergize in transcriptional regulation."** Author(s):Pitulescu ME,Teichmann M,Luo L,Kessel M PubMed Article URL:http://dx.doi.org/10.1186/1471-2091-10-16
Human / 1:500	32-5200 was used in Immunohistochemistry-immunofluorescence to show that expansion microscopy enables superresolved imaging of the highly dynamic structure of nuclei in immune cells. Biophysical reports (2023; 3:) **"Expansion microscopy of neutrophil nuclear structure and extracellular traps."** Author(s):Holsapple JS,Schnitzler L,Rusch L,Baldeweg TH,Neubert E,Kruss S,Erpenbeck L PubMed Article URL:http://dx.doi.org/10.1016/j.bpr.2022.100091
Not Applicable / Not Cited	32-5200 was used in immunohistochemistry to assess the role of nucleophosmin exon-12 mutations in adult acute myeloid leukemia Blood (2006; 108: 1999) **"Immunohistochemistry predicts nucleophosmin (NPM) mutations in acute myeloid leukemia."** Author(s):Falini B,Martelli MP,Bolli N,Bonasso R,Ghia E,Pallotta MT,Diverio D,Nicoletti I,Pacini R,Tabarrini A,Galletti BV, Mannucci R,Roti G,Rosati R,Specchia G,Liso A,Tiacci E,Alcalay M,Luzi L,Volorio S,Bernard L,Guarini A,Amadori S, Mandelli F,Pane F,Lo-Coco F,Saglio G,Pelicci PG,Martelli MF,Mecucci C PubMed Article URL:http://dx.doi.org/10.1182/blood-2006-03-007013
Mouse / 1:200	32-5200 was used in Immunohistochemistry to describe the generation of an inducible Sod1 knockout in KRAS-driven NSCLC mouse model. Nature communications (2021; 12:) **"SOD1 regulates ribosome biogenesis in KRAS mutant non-small cell lung cancer."** Author(s):Wang X,Zhang H,Sapio R,Yang J,Wong J,Zhang X,Guo JY,Pine S,Van Remmen H,Li H,White E,Liu C,Kiledjian M,Pestov DG,Steven Zheng XF PubMed Article URL:http://dx.doi.org/10.1038/s41467-021-22480-x
Human / Not Cited	325200 was used in immunohistochemistry to investigate the roles of PARP2 and PARP3 during DNA break repair Nucleic acids research (2017; 45: 2546) **"Overlapping roles for PARP1 and PARP2 in the recruitment of endogenous XRCC1 and PNKP into oxidized chromatin."** Author(s):Hanzlikova H,Gittens W,Krejcikova K,Zeng Z,Caldecott KW PubMed Article URL:http://dx.doi.org/10.1093/nar/gkw1246

24 Immunocytochemistry References

Species / Dilution	Summary
Human / Not Cited	32-5200 was used in immunocytochemistry to investigate the effect of modulating the rRNA transcription rate on p53 induction in mammalian cells. Oncogene (2011; 30: 3274) **"The balance between rRNA and ribosomal protein synthesis up- and downregulates the tumour suppressor p53 in mammalian cells."** Author(s):Donati G,Bertoni S,Brighenti E,Vici M,Treré D,Volarevic S,Montanaro L,Derenzini M PubMed Article URL:http://dx.doi.org/10.1038/onc.2011.48
Human / Not Cited Virus / Not Cited	Oncogene (2006; 25: 448) **"Hepatitis C virus core protein recruits nucleolar phosphoprotein B23 and coactivator p300 to relieve the repression effect of transcriptional factor YY1 on B23 gene expression."** Author(s):Mai RT,Yeh TS,Kao CF,Sun SK,Huang HH,Wu Lee YH PubMed Article URL:http://dx.doi.org/10.1038/sj.onc.1209052

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	32-5200 was used in immunocytochemistry to assess induced Bax-regulated nuclear rupture and bubble budding followed by release of nuclear proteins due to cellular stress
Not Applicable / Not Cited	Nucleus (Austin, Tex.) (2015; 5: 527) **"Cellular stress induces Bax-regulated nuclear bubble budding and rupture followed by nuclear protein release."** Author(s):Lindenboim L,Sasson T,Worman HJ,Borner C,Stein R PubMed Article URL:http://dx.doi.org/10.4161/19491034.2014.970105
	32-5200 was used in Immunocytochemistry-immunoflourescence to study the effects of heatshock on epigenetic regulators, revealing that the nucleolus acts as a quality control centre and enables recovery of the epigenome after heatshock.
Human / 1:500	eLife (2019; 8:) **"Protein quality control in the nucleolus safeguards recovery of epigenetic regulators after heat shock."** Author(s):Azkanaz M,Rodríguez López A,de Boer B,Huiting W,Angrand PO,Vellenga E,Kampinga HH,Bergink S,Martens JH,Schuringa JJ,van den Boom V PubMed Article URL:http://dx.doi.org/10.7554/eLife.45205
	32-5200 was used in immunocytochemistry to utilize human oocytes, models of in vitro implantation, and embryos to study expression of placenta-specific 8
Not Applicable / 1:100	Fertility and sterility (2016; 106: 781) **"Expression of placenta-specific 8 in human oocytes, embryos, and models of in vitro implantation."** Author(s):Li M,Liu D,Wang L,Wang W,Wang A,Yao Y PubMed Article URL:http://dx.doi.org/10.1016/j.fertnstert.2016.05.018
	32-5200 was used in Immunocytochemistry to introduce new tools for studies of the redox biology of the mammalian nucleolus and identifies pre-rRNA maturation steps sensitive to H2O2 stress.
Mouse / 1:2000	Frontiers in molecular biosciences (2021; 8:) **"Effects of Hydrogen Peroxide Stress on the Nucleolar Redox Environment and Pre-rRNA Maturation."** Author(s):Sapio RT,Burns CJ,Pestov DG PubMed Article URL:http://dx.doi.org/10.3389/fmolb.2021.678488
	32-5200 was used in immunocytochemistry to report that an early reprogramming event remodels ribosomal chromatin and gene expression.
Human / Not Cited	Biochemical and biophysical research communications (2011; 412: 487) **"Remodeling of ribosomal genes in somatic cells by Xenopus egg extract."** Author(s):Østrup O,Hyttel P,Klærke DA,Collas P PubMed Article URL:http://dx.doi.org/10.1016/j.bbrc.2011.07.128
	32-5200 was used in immunocytochemistry, immunoprecipitation, and western blot to study translocation of p14(ARF)/p19 (ARF) and B23 into the nucleus
Not Applicable / Not Cited	Cancer research (2008; 68: 1398) **"DNA damage-dependent translocation of B23 and p19 ARF is regulated by the Jun N-terminal kinase pathway."** Author(s):Yogev O,Saadon K,Anzi S,Inoue K,Shaulian E PubMed Article URL:http://dx.doi.org/10.1158/0008-5472.CAN-07-2865
	32-5200 was used in Immunocytochemistry to highlight that ISGs may cooperate in their antiviral activity that may be explored for therapeutic targeting.
Human / 1:200	EMBO reports (2021; 22:) **"Interferon-induced degradation of the persistent hepatitis B virus cccDNA form depends on ISG20."** Author(s):Stadler D,Kächele M,Jones AN,Hess J,Urban C,Schneider J,Xia Y,Oswald A,Nebioglu F,Bester R,Lasitschka F,Ringelhan M,Ko C,Chou WM,Geerlof A,van de Klundert MA,Wettengel JM,Schirmacher P,Heikenwälder M,Schreiner S,Bartenschlager R,Pichlmair A,Sattler M,Unger K,Protzer U PubMed Article URL:http://dx.doi.org/10.15252/embr.201949568
Human / Not Cited	BMC cancer (2010; 10:) **"Glycogen Synthase Kinase-3 regulates multiple myeloma cell growth and bortezomib-induced cell death."** Author(s):Piazza F,Manni S,Tubi LQ,Montini B,Pavan L,Colpo A,Gnoato M,Cabrelle A,Adami F,Zambello R,Trentin L,Gurrieri C,Semenzato G PubMed Article URL:http://dx.doi.org/10.1186/1471-2407-10-526
	32-5200 was used in Immunocytochemistry to analyze in a cellular model the relative toxicity of DPRs and RNA.
Human / 1:1000	eLife (2021; 10:) **"Multiple pathways of toxicity induced by C9orf72 dipeptide repeat aggregates and G₄C₂ RNA in a cellular model."** Author(s):Frottin F,Pérez-Berlanga M,Hartl FU,Hipp MS PubMed Article URL:http://dx.doi.org/10.7554/eLife.62718

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	32-5200 was used in immunocytochemistry to study why HSC function declines with age
Mouse / Not Cited	Nature (2014; 512: 198) **"Replication stress is a potent driver of functional decline in ageing haematopoietic stem cells."** Author(s):Flach J,Bakker ST,Mohrin M,Conroy PC,Pietras EM,Reynaud D,Alvarez S,Diolaiti ME,Ugarte F,Forsberg EC,Le Beau MM,Stohr BA,Méndez J,Morrison CG,Passegué E PubMed Article URL:http://dx.doi.org/10.1038/nature13619
Mouse / Not Cited	32-5200 was used in Immunocytochemistry to demonstrate that MYC is coordinately regulated by cell-autonomous and microenvironmental signals, and establish CAF-derived FGF1 as a novel paracrine regulator of oncogenic transcription. The Journal of experimental medicine (2020; 217:) **"Acidic fibroblast growth factor underlies microenvironmental regulation of MYC in pancreatic cancer."** Author(s):Bhattacharyya S,Oon C,Kothari A,Horton W,Link J,Sears RC,Sherman MH PubMed Article URL:http://dx.doi.org/10.1084/jem.20191805
Human / 1:50	32-5200 was used in Immunocytochemistry to combine 3D DNA points accumulation for imaging in nanoscale topography with spinning disk confocal hardware to remove the requirement of complex hardware for single-molecule localisation microscopy in thick samples. Nature communications (2017; 8:) **"Multiplexed 3D super-resolution imaging of whole cells using spinning disk confocal microscopy and DNA-PAINT."** Author(s):Schueder F,Lara-Gutiérrez J,Beliveau BJ,Saka SK,Sasaki HM,Woehrstein JB,Strauss MT,Grabmayr H,Yin P,Jungmann R PubMed Article URL:http://dx.doi.org/10.1038/s41467-017-02028-8
Human / Not Cited	325200 was used in immunocytochemistry and western blot to report that PPM1D modulates nucleolar formation by regulating NPM phosphorylation Scientific reports (2016; 6:) **"PPM1D controls nucleolar formation by up-regulating phosphorylation of nucleophosmin."** Author(s):Kozakai Y,Kamada R,Furuta J,Kiyota Y,Chuman Y,Sakaguchi K PubMed Article URL:http://dx.doi.org/10.1038/srep33272
/ Not Cited Human / Not Cited	32-5200 was used in Immunocytochemistry-immunofluorescence to investigate multiplexed fluorescenscence imaging with spectral microscopy. Light, science & applications (2021; 10:) **"Excitation spectral microscopy for highly multiplexed fluorescence imaging and quantitative biosensing."** Author(s):Chen K,Yan R,Xiang L,Xu K PubMed Article URL:http://dx.doi.org/10.1038/s41377-021-00536-3
Human / 1:2,000	32-5200 was used in Immunocytochemistry to study the proteasome-dependent degradation of NPM1 leukaemic protein and apoptosis induced by all-trans retinoic acid plus arsenic trioxide in NPM1-mutated AML cell lines and primary patients' cells. Blood (2015; 125: 3455) **"Arsenic trioxide and all-trans retinoic acid target NPM1 mutant oncoprotein levels and induce apoptosis in NPM1-mutated AML cells."** Author(s):Martelli MP,Gionfriddo I,Mezzasoma F,Milano F,Pierangeli S,Mulas F,Pacini R,Tabarrini A,Pettirossi V,Rossi R,Vetro C,Brunetti L,Sportoletti P,Tiacci E,Di Raimondo F,Falini B PubMed Article URL:http://dx.doi.org/10.1182/blood-2014-11-611459
Human / Not Cited	Acta biochimica et biophysica Sinica (2009; 41: 991) **"B23 interacts with PES1 and is involved in nucleolar localization of PES1."** Author(s):Zhang J,Yang Y,Wu J PubMed Article URL:http://dx.doi.org/10.1093/abbs/gmp096
/ Not Cited	32-5200 was used in Immunocytochemistry-immunofluorescence to show an easy-to-implement, cost-effective microscopy system for visualizing complex cellular components with more colors and lower crosstalks. Biomedical optics express (2022; 13: 6048) **"Super-multiplexing excitation spectral microscopy with multiple fluorescence bands."** Author(s):Chen K,Li W,Xu K PubMed Article URL:http://dx.doi.org/10.1364/BOE.473241
Human / 1:1,000	Science signaling (2010; 3:) **"Extensive crosstalk between O-GlcNAcylation and phosphorylation regulates cytokinesis."** Author(s):Wang Z,Udeshi ND,Slawson C,Compton PD,Sakabe K,Cheung WD,Shabanowitz J,Hunt DF,Hart GW PubMed Article URL:http://dx.doi.org/10.1126/scisignal.2000526

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	32-5200 was used in Immunofluorescence to study the effect of overexpressing nuclear pore protein NUP88 on the probability of intestinal tumors in mice.
Mouse / 1:100	The Journal of clinical investigation (2016; 126: 543) **"Nuclear pore protein NUP88 activates anaphase-promoting complex to promote aneuploidy."** Author(s):Naylor RM,Jeganathan KB,Cao X,van Deursen JM PubMed Article URL:http://dx.doi.org/10.1172/JCI82277
	32-5200 was used in immunocytochemistry to identify proteins whose expression is altered in the nucleoli of leukemic cells.
Human / Not Cited	Leukemia research (2012; 36: 232) **"Nucleolar proteins with altered expression in leukemic cell lines."** Author(s):Teittinen KJ,Kärkkäinen P,Salonen J,Rönnholm G,Korkeamäki H,Vihinen M,Kalkkinen N,Lohi O PubMed Article URL:http://dx.doi.org/10.1016/j.leukres.2011.06.038
	32-5200 was used in immunocytochemistry to discuss methods used to examine the spatial arrangement of nuclear objects
Not Applicable / 0.5 µg/µl	PloS one (2012; 7:) **"Analysis of spatial point patterns in nuclear biology."** Author(s):Weston DJ,Adams NM,Russell RA,Stephens DA,Freemont PS PubMed Article URL:http://dx.doi.org/10.1371/journal.pone.0036841
	32-5200 was used in Immunocytochemistry-immunoflourescence to identify nuclear export factor 3 as a transporter that alters the nucleocytoplasmic distribution of box C/D small nucleolar RNAs from the ribosomal protein L13a locus.
Mouse / 1:1,000	The Journal of biological chemistry (2017; 292: 20228) **"Nuclear export factor 3 regulates localization of small nucleolar RNAs."** Author(s):Li MW,Sletten AC,Lee J,Pyles KD,Matkovich SJ,Ory DS,Schaffer JE PubMed Article URL:http://dx.doi.org/10.1074/jbc.M117.818146

22 Western Blot References

Species / Dilution	Summary
	325200 was used in western blot to examine the functional meaning of oligomerization of NPM1/nucleophosmin
Human / Not Cited	Biochemical and biophysical research communications (2016; 480: 702) **"Functional characterization and efficient detection of Nucleophosmin/NPM1 oligomers."** Author(s):Lin J,Hisaoka M,Nagata K,Okuwaki M PubMed Article URL:http://dx.doi.org/10.1016/j.bbrc.2016.10.125
Human / Not Cited	Human molecular genetics (2011; 20: 4840) **"The role of RPGR in cilia formation and actin stability."** Author(s):Gakovic M,Shu X,Kasioulis I,Carpanini S,Moraga I,Wright AF PubMed Article URL:http://dx.doi.org/10.1093/hmg/ddr423
	32-5200 was used in immunocytochemistry and western blot to propose that nucleophosmin is a Ran-Crm1 substrate that controls centrosome duplication
Not Applicable / Not Cited	Nature cell biology (2005; 7: 823) **"Temporal and spatial control of nucleophosmin by the Ran-Crm1 complex in centrosome duplication."** Author(s):Wang W,Budhu A,Forgues M,Wang XW PubMed Article URL:http://dx.doi.org/10.1038/ncb1282
	32-5200 was used in western blot to investigate the effect of CK2-mediated phosphorylation of B23/NPM on specific genes in cancer cells
Human / Not Cited	Molecular and cellular biochemistry (2015; 404: 103) **"Pharmacologic inhibition of the CK2-mediated phosphorylation of B23/NPM in cancer cells selectively modulates genes related to protein synthesis, energetic metabolism, and ribosomal biogenesis."** Author(s):Perera Y,Pedroso S,Borras-Hidalgo O,Vázquez DM,Miranda J,Villareal A,Falcón V,Cruz LD,Farinas HG,Perea SE PubMed Article URL:http://dx.doi.org/10.1007/s11010-015-2370-x
	32-5200 was used in western blot to examine the role of mitochondrial p32 in ARF-induced apoptosis
Not Applicable / Not Cited	Cancer cell (2008; 13: 542) **"Mitochondrial p32 is a critical mediator of ARF-induced apoptosis."** Author(s):Itahana K,Zhang Y PubMed Article URL:http://dx.doi.org/10.1016/j.ccr.2008.04.002

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Mouse / Not Cited	The Journal of biological chemistry (2005; 280: 21763) **"Free cholesterol-loaded macrophages are an abundant source of tumor necrosis factor-alpha and interleukin-6: model of NF-kappaB- and map kinase-dependent inflammation in advanced atherosclerosis."** Author(s):Li Y,Schwabe RF,DeVries-Seimon T,Yao PM,Gerbod-Giannone MC,Tall AR,Davis RJ,Flavell R,Brenner DA, Tabas I PubMed Article URL:http://dx.doi.org/10.1074/jbc.M501759200
Human / Not Cited	32-5200 was used in western blot to investigate the mechanism for the RNautophagy/DNautophagy effect of LAMP2C Biochemical and biophysical research communications (2015; 460: 281) **"An RNautophagy/DNautophagy receptor, LAMP2C, possesses an arginine-rich motif that mediates RNA/DNA-binding."** Author(s):Fujiwara Y,Hase K,Wada K,Kabuta T PubMed Article URL:http://dx.doi.org/10.1016/j.bbrc.2015.03.025
Human / Not Cited	BMC cancer (2010; 10:) **"Glycogen Synthase Kinase-3 regulates multiple myeloma cell growth and bortezomib-induced cell death."** Author(s):Piazza F,Manni S,Tubi LQ,Montini B,Pavan L,Colpo A,Gnoato M,Cabrelle A,Adami F,Zambello R,Trentin L, Gurrieri C,Semenzato G PubMed Article URL:http://dx.doi.org/10.1186/1471-2407-10-526
Human / Not Cited	32-5200 was used in western blot to elucidate the role of NPM-HAUSP in controlling PTEN deubiquitination and trafficking. Leukemia (2013; 27: 1037) **"Nucleophosmin/B26 regulates PTEN through interaction with HAUSP in acute myeloid leukemia."** Author(s):Noguera NI,Song MS,Divona M,Catalano G,Calvo KL,García F,Ottone T,Florenzano F,Faraoni I,Battistini L, Colombo E,Amadori S,Pandolfi PP,Lo-Coco F PubMed Article URL:http://dx.doi.org/10.1038/leu.2012.314
Human / 1:5000	32-5200 was used in Western Blot to identify a novel role of 14-3-3 in regulating centrosome licensing and a novel mechanism underlying the formation and dissociation of 14-3-3 ligand complexes dictated by conserved residues in the 14-3-3 family. Genes to cells : devoted to molecular & cellular mechanisms (2021; 26: 426) **"14-3-3 prevents centrosome duplication by inhibiting NPM1 function."** Author(s):Bose A,Modi K,Dey S,Dalvi S,Nadkarni P,Sudarshan M,Kundu TK,Venkatraman P,Dalal SN PubMed Article URL:http://dx.doi.org/10.1111/gtc.12848
Human / Not Cited	32-5200 was used in Western Blotting to show that EXD2 shows mitochondrial localisation, but is found predominantly associated with the mitochondrial outer-membrane. Scientific reports (2018; 8:) **"The mitochondrial outer-membrane location of the EXD2 exonuclease contradicts its direct role in nuclear DNA repair."** Author(s):Hensen F,Moretton A,van Esveld S,Farge G,Spelbrink JN PubMed Article URL:http://dx.doi.org/10.1038/s41598-018-23690-y
Mouse / Not Cited	32-5200 was used in Western Blotting to show that nuclear interactor of ARF and Mdm2 (NIAM) regulates 2 critical pathways controlling p53 function which are altered in human cancers, implying a potential role for NIAM in tumourigenesis. Cell cycle (Georgetown, Tex.) (2015; 13: 1288) **"Nuclear interactor of ARF and Mdm2 regulates multiple pathways to activate p53."** Author(s):Reed SM,Hagen J,Tompkins VS,Thies K,Quelle FW,Quelle DE PubMed Article URL:http://dx.doi.org/10.4161/cc.28202
Human / Not Cited	32-5200 was used in western blot to study the microstructural, physical, and biological properties of a polycaprolactone nanofibrous composite matrix. Journal of materials science. Materials in medicine (2012; 23: 2619) **"Preparation and characterization of mesoporous bioactive glass/polycaprolactone nanofibrous matrix for bone tissues engineering."** Author(s):Lin HM,Lin YH,Hsu FY PubMed Article URL:http://dx.doi.org/10.1007/s10856-012-4734-z
Human / Not Cited	32-5200 was used in western blot to investigate the role of XRCC1 protein complexes in normal neurological function and identify PARP1 as a therapeutic target in DNA strand break repair-defective disease Nature (2017; 541: 87) **"XRCC1 mutation is associated with PARP1 hyperactivation and cerebellar ataxia."** Author(s):Hoch NC,Hanzlikova H,Rulten SL,Tétreault M,Komulainen E,Ju L,Hornyak P,Zeng Z,Gittens W,Rey SA,Staras K,Mancini GM,McKinnon PJ,Wang ZQ,Wagner JD,Yoon G,Caldecott KW PubMed Article URL:http://dx.doi.org/10.1038/nature20790

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	32-5200 was used in western blot to investigate the effects of oxidized low-density lipoprotein treatment on endothelial cells
Not Applicable / Not Cited	Free radical research (2005; 39: 1335) **"Proteomic characterization of oxidative dysfunction in human umbilical vein endothelial cells (HUVEC) induced by exposure to oxidized LDL."** Author(s):Kinumi T,Ogawa Y,Kimata J,Saito Y,Yoshida Y,Niki E PubMed Article URL:http://dx.doi.org/10.1080/10715760500306695
Human / Not Cited	Science signaling (2010; 3:) **"Extensive crosstalk between O-GlcNAcylation and phosphorylation regulates cytokinesis."** Author(s):Wang Z,Udeshi ND,Slawson C,Compton PD,Sakabe K,Cheung WD,Shabanowitz J,Hunt DF,Hart GW PubMed Article URL:http://dx.doi.org/10.1126/scisignal.2000526
Mouse / Not Cited	Cancer research (2005; 65: 2755) **"Proteomic analysis reveals hyperactivation of the mammalian target of rapamycin pathway in neurofibromatosis 1-associated human and mouse brain tumors."** Author(s):Dasgupta B,Yi Y,Chen DY,Weber JD,Gutmann DH PubMed Article URL:http://dx.doi.org/10.1158/0008-5472.CAN-04-4058
Human / 1:1000	32-5200 was used in Western Blotting to indicate that HOTAIRM1 may be a promising therapeutic target for this distinct leukemia subtype. Journal of experimental & clinical cancer research : CR (2021; 40:) **"Mutant NPM1-regulated lncRNA HOTAIRM1 promotes leukemia cell autophagy and proliferation by targeting EGR1 and ULK3."** Author(s):Jing Y,Jiang X,Lei L,Peng M,Ren J,Xiao Q,Tao Y,Tao Y,Huang J,Wang L,Tang Y,Yang Z,Yang Z,Zhang L PubMed Article URL:http://dx.doi.org/10.1186/s13046-021-02122-2
Human / Not Cited	32-5200 was used in Western Blotting to study the molecular details regulating Ape1 enzymatic activities on G4-telomeric sequences. DNA repair (2019; 73: 129) **"Human AP-endonuclease (Ape1) activity on telomeric G4 structures is modulated by acetylatable lysine residues in the N-terminal sequence."** Author(s):Burra S,Marasco D,Malfatti MC,Antoniali G,Virgilio A,Esposito V,Demple B,Galeone A,Tell G PubMed Article URL:http://dx.doi.org/10.1016/j.dnarep.2018.11.010
Not Applicable / Not Cited	32-5200 was used in western blot to test if a viral cyclin-CDK6 complex is a regulator of the Notch receptor Cell cycle (Georgetown, Tex.) (2015; 13: 3670) **"KSHV viral cyclin interferes with T-cell development and induces lymphoma through Cdk6 and Notch activation in vivo."** Author(s):Pekkonen P,Järviluoma A,Zinovkina N,Cvrljevic A,Prakash S,Westermarck J,Evan GI,Cesarman E,Verschuren EW,Ojala PM PubMed Article URL:http://dx.doi.org/10.4161/15384101.2014.964118
Not Applicable / Not Cited	32-5200 was used in western blot to examine whether nucleolar localization determines the stability of ARF tumor suppressor gene Oncogene (2008; 27: 2382) **"Binding to nucleophosmin determines the localization of human and chicken ARF but not its impact on p53."** Author(s):Moulin S,Llanos S,Kim SH,Peters G PubMed Article URL:http://dx.doi.org/10.1038/sj.onc.1210887
Human / Not Cited Mouse / Not Cited	Molecular cancer research : MCR (2003; 1: 195) **"Cyclin G1 has growth inhibitory activity linked to the ARF-Mdm2-p53 and pRb tumor suppressor pathways."** Author(s):Zhao L,Samuels T,Winckler S,Korgaonkar C,Tompkins V,Horne MC,Quelle DE PubMed Article URL:http://www.ncbi.nlm.nih.gov/pubmed/12556559

19 Miscellaneous PubMed References

Species / Dilution	Summary
Human / 1:100	32-5200 was used in immunohistochemistry (paraffin) to investigate prognostic markers of melanoma. Indian journal of pathology & microbiology (2012; 54: 482) **"The enigmatic role of nucleophosmin in malignant melanoma: does it have an effect?"** Author(s):Calli AO,Sari A,Evcim G,Altinboga A,Sadullahoglu C,Ermete M PubMed Article URL:http://dx.doi.org/10.4103/0377-4929.85079
Human / Not Cited	32-5200 was used in western blot to identify TRIM28/KAP1 as a novel ARF-binding protein and SUMO E3 ligase for NPM1 /B23. Molecular and cellular biology (2015; 35: 2851) **"TRIM28 Is an E3 Ligase for ARF-Mediated NPM1/B23 SUMOylation That Represses Centrosome Amplification."** Author(s):Neo SH,Itahana Y,Alagu J,Kitagawa M,Guo AK,Lee SH,Tang K,Itahana K PubMed Article URL:http://dx.doi.org/10.1128/MCB.01064-14

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	32-5200 was used in immunocytochemistry to report that TopBP1 and ATR inhibit the synthesis of rRNA and activate the nucleolar stress pathway.
Human / Not Cited	Nucleic acids research (2015; 43: 4975) **"High levels of TopBP1 induce ATR-dependent shut-down of rRNA transcription and nucleolar segregation."** Author(s):Sokka M,Rilla K,Miinalainen I,Pospiech H,Syväoja JE PubMed Article URL:http://dx.doi.org/10.1093/nar/gkv371
Human / 1 µg/ml	32-5200 was used in immunocytochemistry to describe the protein profiles of two distinct groups of chronic lymphocytic leukemia. British journal of haematology (2010; 148: 534) **"Ribosome-associated nucleophosmin 1: increased expression and shuttling activity distinguishes prognostic subtypes in chronic lymphocytic leukaemia."** Author(s):Rees-Unwin KS,Faragher R,Unwin RD,Adams J,Brown PJ,Buckle AM,Pettitt A,Hutchinson CV,Johnson SM, Pulford K,Banham AH,Whetton AD,Lucas G,Mason DY,Burthem J PubMed Article URL:http://dx.doi.org/10.1111/j.1365-2141.2009.07979.x
Human / Not Cited	32-5200 was used in immunoprecipitation to report that five lysine residues in the APE1 N-terminal unstructured domain are important for the interaction of APE1 with both RNA and NPM1 Nucleic acids research (2010; 38: 8239) **"Critical lysine residues within the overlooked N-terminal domain of human APE1 regulate its biological functions."** Author(s):Fantini D,Vascotto C,Marasco D,D'Ambrosio C,Romanello M,Vitagliano L,Pedone C,Poletto M,Cesaratto L, Quadrifoglio F,Scaloni A,Radicella JP,Tell G PubMed Article URL:http://dx.doi.org/10.1093/nar/gkq691
Human / Not Cited	32-5200 was used in western blot to study NPM-ALK-amplified cell lines resistant to ALK tyrosine kinase inhibitors Oncogene (2016; 35: 3854) **"Excess of NPM-ALK oncogenic signaling promotes cellular apoptosis and drug dependency."** Author(s):Ceccon M,Merlo MEB,Mologni L,Poggio T,Varesio LM,Menotti M,Bombelli S,Rigolio R,Manazza AD,Di Giacomo F,Ambrogio C,Giudici G,Casati C,Mastini C,Compagno M,Turner SD,Gambacorti-Passerini C,Chiarle R,Voena C PubMed Article URL:http://dx.doi.org/10.1038/onc.2015.456
Human / Not Cited	32-5200 was used in western blot to investigate the interactions between SERPINB4 and human GrM. PloS one (2012; 6:) **"Intracellular serine protease inhibitor SERPINB4 inhibits granzyme M-induced cell death."** Author(s):de Koning PJ,Kummer JA,de Poot SA,Quadir R,Broekhuizen R,McGettrick AF,Higgins WJ,Devreese B,Worrall DM,Bovenschen N PubMed Article URL:http://dx.doi.org/10.1371/journal.pone.0022645
Human / Not Cited	32-5200 was used in immunoprecipitation to characterize human JHDM1B. Nature (2007; 450: 309) **"JHDM1B/FBXL10 is a nucleolar protein that represses transcription of ribosomal RNA genes."** Author(s):Frescas D,Guardavaccaro D,Bassermann F,Koyama-Nasu R,Pagano M PubMed Article URL:http://dx.doi.org/10.1038/nature06255
Human / Not Cited	32-5200 was used in western blot to investigate phosphoinositide-regulated nuclear functions Molecular & cellular proteomics : MCP (2011; 10:) **"Identification of nuclear phosphatidylinositol 4,5-bisphosphate-interacting proteins by neomycin extraction."** Author(s):Lewis AE,Sommer L,Arntzen MØ,Strahm Y,Morrice NA,Divecha N,D'Santos CS PubMed Article URL:http://dx.doi.org/10.1074/mcp.M110.003376
Mouse / Not Cited	32-5200 was used in immunocytochemistry to assess the effects of host aging on mammary tumor growth. The American journal of pathology (2012; 181: 278) **"Caveolin-1 and accelerated host aging in the breast tumor microenvironment: chemoprevention with rapamycin, an mTOR inhibitor and anti-aging drug."** Author(s):Mercier I,Camacho J,Titchen K,Gonzales DM,Quann K,Bryant KG,Molchansky A,Milliman JN,Whitaker-Menezes D,Sotgia F,Jasmin JF,Schwarting R,Pestell RG,Blagosklonny MV,Lisanti MP PubMed Article URL:http://dx.doi.org/10.1016/j.ajpath.2012.03.017
Human / Not Cited	32-5200 was used in western blot to study the mechanisms underlying the regulation of p21 gene expression by TSG101. PloS one (2014; 8:) **"Identification of TSG101 functional domains and p21 loci required for TSG101-mediated p21 gene regulation."** Author(s):Lin YS,Chen YJ,Cohen SN,Cheng TH PubMed Article URL:http://dx.doi.org/10.1371/journal.pone.0079674

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	32-5200 was used in immunocytochemistry to identify PHF8 as a demethylase of histone H3 lysine 9
Human / Not Cited	Cell research (2010; 20: 794) **"PHF8 is a histone H3K9me2 demethylase regulating rRNA synthesis."** Author(s):Zhu Z,Wang Y,Li X,Wang Y,Xu L,Wang X,Sun T,Dong X,Chen L,Mao H,Yu Y,Li J,Chen PA,Chen CD PubMed Article URL:http://dx.doi.org/10.1038/cr.2010.75
Human / 1:100	32-5200 was used in immunohistochemistry (paraffin) to assess the extracellular matrix in tumor cells cultured in different 3D environments.
	Experimental cell research (2013; 319: 1515) **"The role of 3D microenvironmental organization in MCF-7 epithelial-mesenchymal transition after 7 culture days."** Author(s):Foroni L,Vasuri F,Valente S,Gualandi C,Focarete ML,Caprara G,Scandola M,D'Errico-Grigioni A,Pasquinelli G PubMed Article URL:http://dx.doi.org/10.1016/j.yexcr.2013.03.035
Human / 1:1000	32-5200 was used in western blot to identify and characterize the role of DDX31 in renal carcinogenesis.
	Cancer research (2012; 72: 5867) **"DDX31 regulates the p53-HDM2 pathway and rRNA gene transcription through its interaction with NPM1 in renal cell carcinomas."** Author(s):Fukawa T,Ono M,Matsuo T,Uehara H,Miki T,Nakamura Y,Kanayama HO,Katagiri T PubMed Article URL:http://dx.doi.org/10.1158/0008-5472.CAN-12-1645
Human / Not Cited	32-5200 was used in western blot to study granzyme M-induced cell death.
	Cell death and differentiation (2014; 21: 416) **"Granzyme M targets topoisomerase II alpha to trigger cell cycle arrest and caspase-dependent apoptosis."** Author(s):de Poot SA,Lai KW,van der Wal L,Plasman K,Van Damme P,Porter AC,Gevaert K,Bovenschen N PubMed Article URL:http://dx.doi.org/10.1038/cdd.2013.155
Human / 1:500	32-5200 was used in western blot to examine NPM1 gene and protein expression in gastric tumors.
	BMC gastroenterology (2014; 14:) **"Deregulated expression of Nucleophosmin 1 in gastric cancer and its clinicopathological implications."** Author(s):Leal MF,Mazzotti TK,Calcagno DQ,Cirilo PD,Martinez MC,Demachki S,Assumpção PP,Chammas R,Burbano RR,Smith MC PubMed Article URL:http://dx.doi.org/10.1186/1471-230X-14-9
Human / 1 µg/ml	32-5200 was used in western blot to report that CIGB-300's antiproliferative activity on tumor cells strongly correlates with its nucleolar localization.
	Journal of peptide science : an official publication of the European Peptide Society (2012; 18: 215) **"Sensitivity of tumor cells towards CIGB-300 anticancer peptide relies on its nucleolar localization."** Author(s):Perera Y,Costales HC,Diaz Y,Reyes O,Farina HG,Mendez L,Gómez RE,Acevedo BE,Gomez DE,Alonso DF,Perea SE PubMed Article URL:http://dx.doi.org/10.1002/psc.1432
Human / 1:100	32-5200 was used in immunohistochemistry (paraffin) to determine the nucleophosmin/B23 expression in renal cell carcinomas and renal oncocytomas.
	APMIS : acta pathologica, microbiologica, et immunologica Scandinavica (2012; 120: 187) **"Nucleophosmin expression in renal cell carcinoma and oncocytoma."** Author(s):Sari A,Calli A,Altinboga AA,Pehlivan FS,Gorgel SN,Balci U,Ermete M,Dincel C,Cakalagaoglu F PubMed Article URL:http://dx.doi.org/10.1111/j.1600-0463.2011.02835.x
Mouse / Not Cited	32-5200 was used in western blot to demonstrate that the nucleolar tumor suppressor p19(ARF) suppresses vascular endothelial growth factor A expression
	Cancer research (2010; 70: 4749) **"ARF suppresses tumor angiogenesis through translational control of VEGFA mRNA."** Author(s):Kawagishi H,Nakamura H,Maruyama M,Mizutani S,Sugimoto K,Takagi M,Sugimoto M PubMed Article URL:http://dx.doi.org/10.1158/0008-5472.CAN-10-0368

3 Immunoprecipitation References

Species / Dilution	Summary
Human / Not Cited	Science signaling (2010; 3:) **"Extensive crosstalk between O-GlcNAcylation and phosphorylation regulates cytokinesis."** Author(s):Wang Z,Udeshi ND,Slawson C,Compton PD,Sakabe K,Cheung WD,Shabanowitz J,Hunt DF,Hart GW PubMed Article URL:http://dx.doi.org/10.1126/scisignal.2000526

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	32-5200 was used in Immunoprecipitation to demonstrate a role for the host nucleolar protein nucleophosmin (NPM1/B23) during assembly of HPV16 pseudovirus.
Human / Not Cited	Papillomavirus research (Amsterdam, Netherlands) (2015; 1: 74) **"Involvement of Nucleophosmin (NPM1/B23) in Assembly of Infectious HPV16 Capsids."** Author(s):Day PM,Thompson CD,Pang YY,Lowy DR,Schiller JT PubMed Article URL:http://dx.doi.org/10.1016/j.pvr.2015.06.005
Non-human primate / 1.5 µg /ml Human / 1.5 µg/ml Mouse / 1.5 µg/ml	Molecular and cellular biology (2005; 25: 1258) **"Nucleophosmin (B23) targets ARF to nucleoli and inhibits its function."** Author(s):Korgaonkar C,Hagen J,Tompkins V,Frazier AA,Allamargot C,Quelle FW,Quelle DE PubMed Article URL:http://dx.doi.org/10.1128/MCB.25.4.1258-1271.2005

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