

## REFERENCES

1. Sager R, Sheng S, Pemberton P, Hendrix MJ. Maspin. A tumor suppressing serpin. *Adv Exp Med Biol.* 1997;425:77-88.
2. Streuli CH. Maspin is a tumour suppressor that inhibits breast cancer tumour metastasis *in vivo*. *Breast Cancer Res.* 2002;4(4):137-40.
3. Sheng S. The promise and challenge toward the clinical application of maspin in cancer. *Front Biosci.* 2004;9:2733-45.
4. Bailey CM, Khalkhali-Ellis Z, Seftor EA, Hendrix MJ. Biological functions of maspin. *J Cell Physiol.* 2006;209(3):617-24.
5. Seftor RE, Seftor EA, Sheng S, Pemberton PA, Sager R, Hendrix MJ. maspin suppresses the invasive phenotype of human breast carcinoma. *Cancer Res.* 1998;58(24):5681-5.
6. Zou Z, Anisowicz A, Hendrix MJ, Thor A, Neveu M, Sheng S, *et al.* Maspin, a serpin with tumor-suppressing activity in human mammary epithelial cells. *Science.* 1994;263(5146):526-9.
7. Maass N, Hojo T, Zhang M, Sager R, Jonat W, Nagasaki K. Maspin--a novel protease inhibitor with tumor-suppressing activity in breast cancer. *Acta Oncol.* 2000;39(8):931-4.
8. Odero-Marah VA, Khalkhali-Ellis Z, Chunthapong J, Amir S, Seftor RE, Seftor EA, *et al.* Maspin regulates different signaling pathways for motility and adhesion in aggressive breast cancer cells. *Cancer Biol Ther.* 2003;2(4):398-403.

9. Chen EI, Florens L, Axelrod FT, Monosov E, Barbas CF, 3rd, Yates JR, 3rd, *et al.* Maspin alters the carcinoma proteome. *FASEB J.* 2005;19(9):1123-4.
10. Irving JA, Pike RN, Lesk AM, Whisstock JC. Phylogeny of the serpin superfamily: implications of patterns of amino acid conservation for structure and function. *Genome Res.* 2000;10(12):1845-64.
11. Pemberton PA, Wong DT, Gibson HL, Kiefer MC, Fitzpatrick PA, Sager R, *et al.* The tumor suppressor maspin does not undergo the stressed to relaxed transition or inhibit trypsin-like serine proteases. Evidence that maspin is not a protease inhibitory serpin. *J Biol Chem.* 1995;270(26):15832-7.
12. Bass R, Fernandez AM, Ellis V. Maspin inhibits cell migration in the absence of protease inhibitory activity. *J Biol Chem.* 2002;277(49):46845-8.
13. Zhang M, Sheng S, Maass N, Sager R. mMaspin: the mouse homolog of a human tumor suppressor gene inhibits mammary tumor invasion and motility. *Mol Med.* 1997;3(1):49-59.
14. Ngamkitidechakul C, Warejcka DJ, Burke JM, O'Brien WJ, Twining SS. Sufficiency of the reactive site loop of maspin for induction of cell-matrix adhesion and inhibition of cell invasion. Conversion of ovalbumin to a maspin-like molecule. *J Biol Chem.* 2003;278(34):31796-806.
15. Patston PA. Serpins and other serine protease inhibitors. *Immunol Today.* 2000;21(7):354.
16. Gettins PG. Serpin structure, mechanism, and function. *Chem Rev.* 2002;102(12):4751-804.

17. Silverman GA, Bird PI, Carrell RW, Church FC, Coughlin PB, Gettins PG, *et al.* The serpins are an expanding superfamily of structurally similar but functionally diverse proteins. Evolution, mechanism of inhibition, novel functions, and a revised nomenclature. *J Biol Chem.* 2001;276(36):33293-6.
18. Horvath AJ, Irving JA, Rossjohn J, Law RH, Bottomley SP, Quinsey NS, *et al.* The murine orthologue of human antichymotrypsin: a structural paradigm for clade A3 serpins. *J Biol Chem.* 2005;280(52):43168-78.
19. Whisstock JC, Bottomley SP. Molecular gymnastics: serpin structure, folding and misfolding. *Curr Opin Struct Biol.* 2006;16(6):761-8.
20. Mikus P, Ny T. Intracellular polymerization of the serpin plasminogen activator inhibitor type 2. *J Biol Chem.* 1996;271(17):10048-53.
21. Hojo T, Akiyama Y, Nagasaki K, Maruyama K, Kikuchi K, Ikeda T, *et al.* Association of maspin expression with the malignancy grade and tumor vascularization in breast cancer tissues. *Cancer Lett.* 2001;171(1):103-10.
22. Maass N, Teffner M, Rosel F, Pawaresch R, Jonat W, Nagasaki K, *et al.* Decline in the expression of the serine proteinase inhibitor maspin is associated with tumour progression in ductal carcinomas of the breast. *J Pathol.* 2001;195(3):321-6.
23. Yasumatsu R, Nakashima T, Hirakawa N, Kumamoto Y, Kuratomi Y, Tomita K, *et al.* Maspin expression in stage I and II oral tongue squamous cell carcinoma. *Head Neck.* 2001;23(11):962-6.
24. Pierson CR, McGowen R, Grignon D, Sakr W, Dey J, Sheng S. Maspin is up-regulated in premalignant prostate epithelia. *Prostate.* 2002;53(4):255-62.

25. Sheng S, Truong B, Fredrickson D, Wu R, Pardee AB, Sager R. Tissue-type plasminogen activator is a target of the tumor suppressor gene maspin. *Proc Natl Acad Sci U S A*. 1998;95(2):499-504.
26. McGowen R, Biliran H, Jr., Sager R, Sheng S. The surface of prostate carcinoma DU145 cells mediates the inhibition of urokinase-type plasminogen activator by maspin. *Cancer Res*. 2000;60(17):4771-8.
27. Fitzpatrick PA, Wong DT, Barr PJ, Pemberton PA. Functional implications of the modeled structure of maspin. *Protein Eng*. 1996;9(7):585-9.
28. Shi HY, Zhang W, Liang R, Kittrell F, Templeton NS, Medina D, *et al*. Modeling human breast cancer metastasis in mice: maspin as a paradigm. *Histol Histopathol*. 2003;18(1):201-6.
29. Sheng S. A role of novel serpin maspin in tumor progression: the divergence revealed through efforts to converge. *J Cell Physiol*. 2006;209(3):631-5.
30. Bodenshtein TM, Seftor RE, Khalkhali-Ellis Z, Seftor EA, Pemberton PA, Hendrix MJ. Maspin: molecular mechanisms and therapeutic implications. *Cancer Metastasis Rev*. 2012;31(3-4):529-51.
31. Sheng S, Carey J, Seftor EA, Dias L, Hendrix MJ, Sager R. Maspin acts at the cell membrane to inhibit invasion and motility of mammary and prostatic cancer cells. *Proc Natl Acad Sci U S A*. 1996;93(21):11669-74.
32. Sheng S, Pemberton PA, Sager R. Production, purification, and characterization of recombinant maspin proteins. *J Biol Chem*. 1994;269(49):30988-93.

33. Shi HY, Zhang W, Liang R, Abraham S, Kittrell FS, Medina D, *et al.* Blocking tumor growth, invasion, and metastasis by maspin in a syngeneic breast cancer model. *Cancer Res.* 2001;61(18):6945-51.
34. Yin S, Lockett J, Meng Y, Biliran H, Jr., Blouse GE, Li X, *et al.* Maspin retards cell detachment via a novel interaction with the urokinase-type plasminogen activator/urokinase-type plasminogen activator receptor system. *Cancer Res.* 2006;66(8):4173-81.
35. Biliran H, Jr., Sheng S. Pleiotrophic inhibition of pericellular urokinase-type plasminogen activator system by endogenous tumor suppressive maspin. *Cancer Res.* 2001;61(24):8676-82.
36. Shi HY, Stafford LJ, Liu Z, Liu M, Zhang M. Maspin controls mammary tumor cell migration through inhibiting Rac1 and Cdc42, but not the RhoA GTPase. *Cell Motil Cytoskeleton.* 2007;64(5):338-46.
37. Cella N, Contreras A, Latha K, Rosen JM, Zhang M. Maspin is physically associated with [beta]1 integrin regulating cell adhesion in mammary epithelial cells. *FASEB J.* 2006;20(9):1510-2.
38. Endsley MP, Hu Y, Deng Y, He X, Warejcka DJ, Twining SS, *et al.* Maspin, the molecular bridge between the plasminogen activator system and beta1 integrin that facilitates cell adhesion. *J Biol Chem.* 2011;286(28):24599-607.
39. Schwartz AL, Ciechanover A. The ubiquitin-proteasome pathway and pathogenesis of human diseases. *Annu Rev Med.* 1999;50:57-74.

40. Goldstein G, Scheid M, Hammerling U, Schlesinger DH, Niall HD, Boyse EA. Isolation of a polypeptide that has lymphocyte-differentiating properties and is probably represented universally in living cells. *Proc Natl Acad Sci U S A*. 1975;72(1):11-5.
41. Ciechanover A, Schwartz AL. The ubiquitin-proteasome pathway: the complexity and myriad functions of proteins death. *Proc Natl Acad Sci U S A*. 1998;95(6):2727-30.
42. Ciechanover A. Intracellular protein degradation: from a vague idea, through the lysosome and the ubiquitin-proteasome system, and onto human diseases and drug targeting (Nobel lecture). *Angew Chem Int Ed Engl*. 2005;44(37):5944-67.
43. Ozkaynak E, Finley D, Varshavsky A. The yeast ubiquitin gene: head-to-tail repeats encoding a polyubiquitin precursor protein. *Nature*. 1984;312(5995):663-6.
44. Peters JM, Franke WW, Kleinschmidt JA. Distinct 19 S and 20 S subcomplexes of the 26 S proteasome and their distribution in the nucleus and the cytoplasm. *J Biol Chem*. 1994;269(10):7709-18.
45. Ganoth D, Leshinsky E, Eytan E, Hershko A. A multicomponent system that degrades proteins conjugated to ubiquitin. Resolution of factors and evidence for ATP-dependent complex formation. *J Biol Chem*. 1988;263(25):12412-9.
46. Kisselev AF, Goldberg AL. Proteasome inhibitors: from research tools to drug candidates. *Chem Biol*. 2001;8(8):739-58.

47. Groll M, Ditzel L, Lowe J, Stock D, Bochtler M, Bartunik HD, *et al.* Structure of 20S proteasome from yeast at 2.4 Å resolution. *Nature*. 1997;386(6624):463-71.
48. Groll M, Bajorek M, Kohler A, Moroder L, Rubin DM, Huber R, *et al.* A gated channel into the proteasome core particle. *Nat Struct Biol*. 2000;7(11):1062-7.
49. Wenzel T, Baumeister W. Conformational constraints in protein degradation by the 20S proteasome. *Nat Struct Biol*. 1995;2(3):199-204.
50. Deveraux Q, Ustrell V, Pickart C, Rechsteiner M. A 26 S protease subunit that binds ubiquitin conjugates. *J Biol Chem*. 1994;269(10):7059-61.
51. Laemmli UK. Cleavage of structural proteins during the assembly of the head of bacteriophage T4. *Nature*. 1970;227(5259):680-5.
52. Krueger RC, Jr., Schwartz NB. An improved method of sequential alcian blue and ammoniacal silver staining of chondroitin sulfate proteoglycan in polyacrylamide gels. *Anal Biochem*. 1987;167(2):295-300.
53. Wang Z, Howell RM, Burgett EA, Kry SF, Hertel NE, Salehpour M. Calibration of indium response functions in an Au-In-BSE system up to 800 MeV. *Radiat Prot Dosimetry*. 2010;139(4):565-73.
54. Livak KJ, Schmittgen TD. Analysis of relative gene expression data using real-time quantitative PCR and the 2(-Delta Delta C(T)) Method. *Methods*. 2001;25(4):402-8.
55. Abraham S, Zhang W, Greenberg N, Zhang M. Maspin functions as tumor suppressor by increasing cell adhesion to extracellular matrix in prostate tumor cells. *J Urol*. 2003;169(3):1157-61.

56. Pemberton PA, Tipton AR, Pavloff N, Smith J, Erickson JR, Mouchabeck ZM, *et al.* Maspin is an intracellular serpin that partitions into secretory vesicles and is present at the cell surface. *J Histochem Cytochem.* 1997;45(12):1697-706.
57. Naus CC, Laird DW. Implications and challenges of connexin connections to cancer. *Nat Rev Cancer.* 2010;10(6):435-41.
58. Sirnes S, Honne H, Ahmed D, Danielsen SA, Rognum TO, Meling GI, *et al.* DNA methylation analyses of the connexin gene family reveal silencing of GJC1 (Connexin45) by promoter hypermethylation in colorectal cancer. *Epigenetics.* 2011;6(5):602-9.
59. Zhang J, Zhang X, Guo Y, Xu L, Pei D. Sorting nexin 33 induces mammalian cell micronucleated phenotype and actin polymerization by interacting with Wiskott-Aldrich syndrome protein. *J Biol Chem.* 2009;284(32):21659-69.
60. Iyoda M, Kasamatsu A, Ishigami T, Nakashima D, Endo-Sakamoto Y, Ogawara K, *et al.* Epithelial cell transforming sequence 2 in human oral cancer. *PLoS One.* 2010;5(11):e14082.
61. Justilien V, Fields AP. Ect2 links the PKC $\delta$ -Par6 $\alpha$  complex to Rac1 activation and cellular transformation. *Oncogene.* 2009;28(41):3597-607.
62. Goulet B, Kennette W, Ablack A, Postenka CO, Hague MN, Mymryk JS, *et al.* Nuclear localization of maspin is essential for its inhibition of tumor growth and metastasis. *Lab Invest.* 2011;91(8):1181-7.