



DAFTAR PUSTAKA

- Allison, K.H., 2012. Molecular pathology of breast cancer: What a pathologist needs to know. *Am. J. Clin. Pathol.* 138, 770–80.
- An, T., Qin, S., Xu, Y., Tang, Y., Huang, Y., Situ, B., Inal, J.M., Zheng, L., 2015. Exosomes serve as tumour markers for personalized diagnostics owing to their important role in cancer metastasis. *J. Extracell. vesicles* 4, 27522.
- Anindo, M.I.K., Yaqinuddin, A., 2012. Insights into the potential use of microRNAs as biomarker in cancer. *Int. J. Surg.* 10, 443–9.
- Ardyan, I.W., Putra, S., Putu, I.G., IGP, S., 2018. Oncogenic role of miRNA-221 / 222 in breast cancer. *Indones. J. Biomed. Sci.* 12, 24–31.
- Barajas-Castañeda, L.M., Cortés-gutiérrez, E., García-rodríguez, F.M., Campos-rodríguez, R., Lara-padilla, E., Enríquez-rincón, F., Castro-mussot, M.E., Figueroa-arredondo, P., 2016. Overexpression of MMP-3 and uPA with Diminished PAI-1 Related to Metastasis in Ductal Breast Cancer Patients Attending a Public Hospital in Mexico City. *J. Immunol. Res.* 2016, 1–10.
- Bertoli, G., Cava, C., Castiglioni, I., 2015. MicroRNAs: New Biomarkers for Diagnosis, Prognosis, Therapy Prediction and Therapeutic Tools for Breast Cancer. *Theranostics* 5, 1122–43.
- Biermann, J.C., Holzscheiter, L., Kotzsch, M., Luther, T., Kiechle-Bahat, M., Sweep, F.C., Span, P.N., Schmitt, M., Magdolen, V., 2008. Quantitative RT-PCR assays for the determination of urokinase-type plasminogen activator and plasminogen activator inhibitor type 1 mRNA in primary tumor tissue of breast cancer patients: comparison to antigen quantification by ELISA. *Int. J. Mol. Med.* 21, 251–9.
- Brock, G., Castellanos-Rizaldos, E., Hu, L., Coticchia, C., Skog, J., 2015. Liquid biopsy for cancer screening, patient stratification and monitoring. *Transl. Cancer Res.* 4, 280–90. <https://doi.org/10.3978/j.issn.2218-676X.2015.06.05>
- Castello, R., Landete, J.M., Espana, F., Vazquez, C., Fuster, C., Almenar, S.M., Ramon, L.A., Radtke, K.-P., Estelles, A., 2007. Expression PAI 1, PAI 3, uPA protein, and mRNA in breast cancer. *Thromb. Res.* 120, 753–62.
- Chan, S., Wang, L., 2015. Regulation of cancer metastasis by microRNAs. *J Biomed Sci* 22, 1–12.
- Chen, L., Jian, W., Lu, L., Zheng, L., Yu, Z., Zhou, D., 2015. Elevated expression of E-cadherin in primary breast cancer and its corresponding metastatic lymph node. *Int. J. Clin. Exp. Med.* 8, 11752–8.
- Chen, W.X., Hu, Q., Qiu, M.T., Zhong, S.L., Xu, J.J., Tang, J.H., Zhao, J.H., 2013. MiR-221/222: Promising biomarkers for breast cancer. *Tumor Biol.* 34, 1361–70.
- Corcoran, C., Friel, A.M., Duffy, M.J., Crown, J., O'Driscoll, L., 2011. Intracellular and extracellular microRNAs in breast cancer. *Clin. Chem.* 57, 18–32.



- Cortez, M.A., Bueso-ramos, C., Ferdin, J., Lopez-berestein, G., Anil, K., Calin, G. a, 2012. MicroRNAs in body fluids—the mix of hormones and biomarkers. *Nat Rev Clin Oncol* 8, 467–7.
- Dentelli, P., Traversa, M., Rosso, A., Togliatto, G., Olgasi, C., Marchiò, C., Provero, P., Lembo, A., Bon, G., Annaratone, L., Sapino, A., Falcioni, R., Brizzi, M.F., 2014. miR-221/222 control luminal breast cancer tumor progression by regulating different targets. *Cell Cycle* 13, 1811–26.
- Dubois-Marshall, S., Thomas, J.S., Faratian, D., Harrison, D.J., Katz, E., 2011. Two possible mechanisms of epithelial to mesenchymal transition in invasive ductal breast cancer. *Clin. Exp. Metastasis* 28, 811–8.
- Duffy, M.J., McGowan, P.M., Harbeck, N., Thomssen, C., Schmitt, M., 2014. uPA and PAI-1 as biomarkers in breast cancer: validated for clinical use in level-of-evidence-1 studies. *Breast Cancer Res.* 16, 428.
- ElMoneim, H.M.A., Zaghloul, N.M., 2011. Expression of E-cadherin, N-cadherin and snail and their correlation with clinicopathological variants: an immunohistochemical study of 132 invasive ductal breast carcinomas in Egypt. *Clinics (Sao Paulo)*. 66, 1765–71.
- Eroles, P., Bosch, A., Pérez-fidalgo, J.A., Lluch, A., 2012. Molecular biology in breast cancer : Intrinsic subtypes and signaling pathways. *Cancer Treat. Rev.* 38, 698–707.
- Falkenberg, N., Anastasov, N., Rappl, K., Braselmann, H., Auer, G., Walch, A., Huber, M., Höfig, I., Schmitt, M., Höfler, H., Atkinson, M.J., Aubele, M., 2013. MiR-221/222 differentiate prognostic groups in advanced breast cancers and influence cell invasion. *Br. J. Cancer* 1–10.
- Falkenberg, N., Anastasov, N., Schaub, A., Radulovic, V., Schmitt, M., Magdolen, V., Aubele, M., 2015. Secreted uPAR isoform 2 (uPAR7b) is a novel direct target of miR-221. *Oncotarget* 6, 8103–14.
- Ferrier, C.M., de Witte, H.H., Straatman, H., van Tienoven, D.H., van Geloof, W.L., Rietveld, F.J., Sweep, C.G., Ruiter, D.J., van Muijen, G.N., 1999. Comparison of immunohistochemistry with immunoassay (ELISA) for the detection of components of the plasminogen activation system in human tumour tissue. *Br. J. Cancer* 79, 1534–1541.
- Foekens, J.A., Peters, H.A., Look, M.P., Portengen, H., Schmitt, M., Kramer, M.D., Ja, F., Gelder, M.E.M., Henzen-logmans, S.C., Putten, W.L.J. Van, Klijn, J.G.M., 2000. The Urokinase System of Plasminogen Activation and Prognosis in 2780 Breast Cancer Patients 1. *J Cancer Res* 60, 636–43.
- Fowler, C.B., Man, Y.-G., Mason, J.T., 2014. An Ultra-Sensitive Immunoassay for Quantifying Biomarkers in Breast Tumor Tissue. *J. Cancer* 5, 115–24.
- Frixa, T., Donzelli, S., Blandino, G., 2015. Oncogenic MicroRNAs: Key players in malignant transformation. *Cancers (Basel)*. 7, 2466–85.
- Gan, R., Yang, Y., Yang, X., Zhao, L., Lu, J., Meng, Q.H., 2014. Downregulation of miR-221/222 enhances sensitivity of breast cancer cells to tamoxifen through upregulation of TIMP3. *Cancer Gene Ther.* 21, 290–6.
- Garzon, R., Calin, G.A., Croce, C.M., 2009. MicroRNAs in Cancer. *Annu. Rev. Med.* 60, 167–79.
- Graveel, C.R., Calderone, H.M., Westerhuis, J.J., Winn, M.E., Sempere, L.F.,



2015. Critical analysis of the potential for microRNA biomarkers in breast cancer management. *Breast Cancer Targets Ther.* 7, 59–79.
- Han, S., Kim, H.J., Gwak, J.M., Kim, M., Chung, Y.R., Park, S.Y., 2017. MicroRNA-222 Expression as a Predictive Marker for Tumor Progression in Hormone Receptor-Positive Breast Cancer. *J. Breast Cancer* 20, 35–44.
- Harris, L., Fritzsche, H., Mennel, R., Norton, L., Ravdin, P., Taube, S., Somerfield, M.R., Hayes, D.F., Jr, R.C.B., Arbor, A., 2007. American Society of Clinical Oncology 2007 Update of Recommendations for the Use of Tumor Markers in Breast Cancer The American Society of Clinical Oncology. *J. Clin. Oncol.* 25, 5287–312.
- Heneghan, H.M., Miller, N., Kerin, M.J., 2010. MiRNAs as biomarkers and therapeutic targets in cancer. *Curr. Opin. Pharmacol.* 10, 543–50.
- Horne, H.N., Oh, H., Sherman, M.E., Palakal, M., Hewitt, S.M., Schmidt, M.K., Milne, R.L., Hardisson, D., Benitez, J., Blomqvist, C., Bolla, M.K., Brenner, H., Chang-Claude, J., Cora, R., Couch, F.J., Cuk, K., Devilee, P., Easton, D.F., Eccles, D.M., Eilber, U., Hartikainen, J.M., Heikkilä, P., Holleczeck, B., Hooning, M.J., Jones, M., Keeman, R., Mannermaa, A., Martens, J.W.M., Muranen, T.A., Nevanlinna, H., Olson, J.E., Orr, N., Perez, J.I.A., Pharoah, P.D.P., Ruddy, K.J., Saum, K.U., Schoemaker, M.J., Seynaeve, C., Sironen, R., Smit, V.T.H.B.M., Swerdlow, A.J., Tengström, M., Thomas, A.S., Timmermans, A.M., Tollenaar, R.A.E.M., Troester, M.A., Van Asperen, C.J., Van Deurzen, C.H.M., Van Leeuwen, F.F., Van'T Veer, L.J., García-Closas, M., Figueiroa, J.D., 2018. E-cadherin breast tumor expression, risk factors and survival: Pooled analysis of 5,933 cases from 12 studies in the Breast Cancer Association Consortium. *Sci. Rep.* 8, 1–11.
- Inns, J., James, V., 2015. Circulating microRNAs for the prediction of metastasis in breast cancer patients diagnosed with early stage disease. *The Breast* 24, 364–9.
- International Agency for Research on Cancer, 2013. Latest world cancer statistics Global cancer burden rises to 14.1 million new cases in 2012: Marked increase in breast cancers must be addressed., WHO Press Release no 223.
- Iorio, M. V., Croce, C.M., 2012. MicroRNA dysregulation in cancer: diagnostics, monitoring and therapeutics. A comprehensive review. *EMBO Mol. Med.* 4, 143–59.
- Janicke, F., Prechtel, A., Thomssen, C., Harbeck, N., Meisner, C., Untch, M., Sweep, C.G.J.F., Selbmann, H.K., Graeff, H., Schmitt, M., 2001. Randomized adjuvant chemotherapy trial in high-risk, lymph node-negative breast cancer patients identified by urokinase-type plasminogen activator and plasminogen activator inhibitor type 1 3960. *J. Natl. Cancer Inst.* 93, 913–20.
- Jeschke, U., Mylonas, I., Kuhn, C., Shabani, N., Kunert-Keil, C., Schindlbeck, C., Gerber, B., Friese, K., 2007. Expression of E-cadherin in human ductal breast cancer carcinoma *in situ*, invasive carcinomas, their lymph node metastases, their distant metastases, carcinomas with recurrence and in recurrence. *Anticancer Res.* 27, 1969–74.
- Kemenkes, R.I., 2013. Riset Kesehatan Dasar.
- Kemenkes RI, 2015. Situasi Penyakit Kanker, Pusat Data dan Informasi



Kementerian Kesehatan Republik Indonesia.

- Lamy, P.J., Verjat, T., Servanton, A.C., Paye, M., Leissner, P., Mougin, B., 2007. Urokinase-type plasminogen activator and plasminogen activator inhibitor type-1 mRNA assessment in breast cancer by means of NASBA: Correlation with protein expression. *Am. J. Clin. Pathol.* 128, 404–13.
- Leivonen, S.-K., Rokka, A., Ostling, P., Kohonen, P., Corthals, G.L., Kallioniemi, O., Perälä, M., 2011. Identification of miR-193b targets in breast cancer cells and systems biological analysis of their functional impact. *Mol. Cell. Proteomics* 10, 1–9.
- Li, J., Kong, F., Wu, K., Song, K., He, J., Sun, W., 2014. miR-193b directly targets STMN1 and uPA genes and suppresses tumor growth and metastasis in pancreatic cancer. *Mol. Med. Rep.* 10, 2613–20.
- Li, X.-F., Yan, P.-J., Shao, Z.-M., 2009. Downregulation of miR-193b contributes to enhance urokinase-type plasminogen activator (uPA) expression and tumor progression and invasion in human breast cancer. *Oncogene* 28, 3937–48.
- Lin, J., Li, J., Huang, B., Liu, J., Chen, X., Chen, X., Xu, Y., Huang, L., Wang, X., 2015. Exosomes: Novel Biomarkers for Clinical Diagnosis. *Sci. World J.* 2015, ID 657086.
- Lopatina, T., Gai, C., Deregibus, M.C., Kholia, S., Camussi, G., 2016. Cross Talk between Cancer and Mesenchymal Stem Cells through Extracellular Vesicles Carrying Nucleic Acids. *Front. Oncol.* 6, 125.
- Madhavan, D., Peng, C., Wallwiener, M., Zucknick, M., Nees, J., Schott, S., Rudolph, A., Riethdorf, S., Trumpp, A., Pantel, K., Sohn, C., Chang-Claude, J., Schneeweiss, A., Burwinkel, B., 2016. Circulating miRNAs with prognostic value in metastatic breast cancer and or early detection of metastasis. *Carcinogenesis* 1–10.
- Mahmood, N., Mihalcioiu, C., Rabbani, S.A., 2018. Multifaceted Role of the Urokinase-Type Plasminogen Activator (uPA) and Its Receptor (uPAR): Diagnostic, Prognostic, and Therapeutic Applications. *Front. Oncol.* 8, 24.
- Makki, J., 2015. Diversity of breast carcinoma: Histological subtypes and clinical relevance. *Clin. Med. Insights Pathol.* 8, 23–31.
- Malhotra, G.K., Zhao, X., Band, H., Band, V., 2010. Histological , molecular and functional subtypes of breast cancers. *Cancer Biol. Ther.* 10, 955–60.
- Malinowsky, K., Wolff, C., Berg, D., Schuster, T., Walch, A., Bronger, H., Mannsperger, H., Schmidt, C., Korf, U., Höfler, H., Becker, K.-F., 2012. uPA and PAI-1-Related Signaling Pathways Differ between Primary Breast Cancers and Lymph Node Metastases. *Transl. Oncol.* 5, 98-I43.
- McDonald, J.S., Milosevic, D., Reddi, H. V., Grebe, S.K., Algeciras-Schimnich, A., 2011. Analysis of circulating microRNA: Preanalytical and analytical challenges. *Clin. Chem.* 57, 833–40.
- Mekkawy, A.H., Pillai, K., Morris, D.L., 2015. Urokinase-Type Plasminogen Activator System in Breast Cancer, in: *Oncology: Theory & Practice*. iConcept Press Ltd, pp. 1–22.
- Mitra, A.K., Chiang, C.Y., Tiwari, P., Tomar, S., Watters, K.M., Peter, M.E., Lengyel, E., 2015. Microenvironment-induced downregulation of miR-193b



- drives ovarian cancer metastasis. *Oncogene* 2015, 1–10.
- Mulrane, L., McGee, S.F., Gallagher, W.M., O'Connor, D.P., 2013. miRNA dysregulation in breast cancer. *Cancer Res.* 73, 6554–62.
- Nicolini, A., Ferrari, P., Duffy, M.J., 2017. Prognostic and predictive biomarkers in breast cancer: Past, present and future. *Semin. Cancer Biol.* 1–18.
- Osborne, C., 2004. Oncogenes and Tumor Suppressor Genes in Breast Cancer: Potential Diagnostic and Therapeutic Applications. *Oncologist* 9, 361–77.
- Ostad, S.N., Parsa, M., 2011. Breast Cancer from Molecular Point of View: Pathogenesis and Biomarkers, in: *Breast Cancer-Focusing Tumor Microenvironment, Stem Cells and Metastasis*. pp. 103–21.
- Ottewell, P.D., Donnell, L.O., Holen, I., 2015. Molecular alterations that drive breast cancer metastasis to bone. *BoneKey Reports* 4 643, 1–10.
- Palmero, E.I., de Campos, S.G.P., Campos, M., de Souza, N.C.N., Guerreiro, I.D.C., Carvalho, A.L., Marques, M.M.C., 2011. Mechanisms and role of microRNA deregulation in cancer onset and progression. *Genet. Mol. Biol.* 34, 363–70.
- Peng, Y., Croce, C.M., 2016. The role of MicroRNAs in human cancer. *Signal Transduct. Target. Ther.* 1, 15004.
- Rai, H., Ahmed, J., 2014. N-cadherin: a marker of epithelial to mesenchymal transition in tumor progression. *Internet J. Oncol.* 10, 1–12.
- Rauhala, H.E., Jalava, S.E., Isotalo, J., Bracken, H., Lehmusvaara, S., Tammela, T.L.J., Oja, H., Visakorpi, T., 2010. miR-193b is an epigenetically regulated putative tumor suppressor in prostate cancer. *Int. J. Cancer* 127, 1363–1372.
- Reddy, K.B., 2015. MicroRNA (miRNA) in cancer. *Cancer Cell Int.* 15, 38.
- Rezaei, M., Friedrich, K., Wielockx, B., Kuzmanov, A., Kettelhake, A., Labelle, M., Schnittler, H., Baretton, G., Breier, G., 2012. Interplay between neural-cadherin and vascular endothelial-cadherin in breast cancer progression. *Breast Cancer Res.* 14.
- Rosner, B., 2011. Sample Size Estimation for Correlation Coefficients, in: *Fundamentals of Biostatistics*. Brooks/Cole, Boston, pp. 462–3.
- Santibanez, J.F., 2013. Transforming Growth Factor-Beta and Urokinase-Type Plasminogen Activator: Dangerous Partners in Tumorigenesis—Implications in Skin Cancer. *ISRN Dermatol.* 2013, 1–26.
- Schmitt, M., Mengele, K., Gkazepis, A., Napieralski, R., Magdolen, V., Reuning, U., Harbeck, N., 2008. Assessment of urokinase-type plasminogen activator and its inhibitor PAI-1 in breast cancer tissue: Historical aspects and future prospects. *Breast Care* 3, 3–10.
- Scully, O.J., Bay, B.-H., Yip, G., Yu, Y., 2012. Breast cancer metastasis. *Cancer Genomics Proteomics* 9, 311–20.
- Senkus, E., Kyriakides, S., Ohno, S., Penault-Llorca, F., Poortmans, P., Rutgers, E., Zackrisson, S., Cardoso, F., 2015. Primary breast cancer: ESMO Clinical Practice Guidelines for diagnosis, treatment and follow-up. *Ann. Oncol.* 26, v8–v30.
- Sevenich, L., Joyce, J.A., 2014. Pericellular proteolysis in cancer. *Genes Dev.* 28, 2331–47.
- Shah, M.Y., Calin, G.A., 2011. MicroRNAs miR-221 and miR-222 : a new level



- of regulation in aggressive breast cancer. *Genome Med.* 3, 56.
- Singh, R., Mo, Y.-Y., 2013. Role of microRNAs in breast cancer. *Cancer Biol. Ther.* 14, 201–12.
- Syn, N., Wang, L., Sethi, G., Thiery, J.-P., Goh, B.-C., 2016. Exosome-Mediated Metastasis: From Epithelial–Mesenchymal Transition to Escape from Immunosurveillance. *Trends Pharmacol. Sci.* xx, 1–12.
- Tahiri, A., Leivonen, S.K., Luders, T., Steinfeld, I., Aure, M.R., Geisler, J., Makela, R., Nord, S., Riis, M.L.H., Yakhini, Z., Sahlberg, K.K., Borresen-Dale, A.-L., Perala, M., Bukholm, I.R.K., Kristensen, V.N., 2014. Deregulation of cancer-related miRNAs is a common event in both benign and malignant human breast tumors. *Carcinogenesis* 35, 76–85.
- Tang, J., Ahmad, A., Sarkar, F.H., 2012. The Role of MicroRNAs in Breast Cancer Migration, Invasion and Metastasis. *Int. J. Mol. Sci.* 13, 13414–37.
- Tang, L., Han, X., 2013. The urokinase plasminogen activator system in breast cancer invasion and metastasis. *Biomed. Pharmacother.* 67, 179–82.
- Tayyeb, B., Parvin, M., 2016. Pathogenesis of Breast Cancer Metastasis to Brain : a Comprehensive Approach to the Signaling Network. *Mol Neurobiol* 53, 446–54.
- Tiberio, P., Callari, M., Angeloni, V., Daidone, M.G., Appierto, V., 2015. Challenges in Using Circulating miRNAs as Cancer Biomarkers. *Biomed Res. Int.* 2015.
- Vannini, I., Fanini, F., Fabbri, M., 2018. New emerging roles of microRNAs in cancer. *Curr. Opin. Genet. Dev.* 48, 128-33.
- Vimalraj, S., Miranda, P.J., Ramyakrishna, B., Selvamurugan, N., 2013. Regulation of Breast Cancer and Bone Metastasis by MicroRNAs. *Dis. Markers* 35, 369–87.
- Wang, W., Luo, Y., 2015. MicroRNAs in breast cancer: oncogene and tumor suppressors with clinical potential. *J. Zhejiang Univ. Sci. B* 16, 18–31.
- Weigelt, B., Peterse, J.L., van't Veer, L.J., 2005. Breast cancer metastasis: markers and models. *Nat. Rev. Cancer* 5, 591–602.
- Witzel, I.D., Milde-Langosch, K., Wirtz, R.M., Roth, C., Ihnen, M., Mahner, S., Zu Eulenburg, C., Jänicke, F., Müller, V., 2010. Comparison of microarray-based RNA expression with ELISA-based protein determination of HER2, uPA and PAI-1 in tumour tissue of patients with breast cancer and relation to outcome. *J. Cancer Res. Clin. Oncol.* 136, 1709–18.
- Wolff, C., Malinowsky, K., Berg, D., Schragner, K., Schuster, T., Walch, A., Bronger, H., Höfler, H., Becker, K.-F., 2011. Signalling networks associated with urokinase-type plasminogen activator (uPA) and its inhibitor PAI-1 in breast cancer tissues: new insights from protein microarray analysis. *J. Pathol.* 223, 54–63.
- Yamada, A., Cox, M.A., Gaffney, K.A., Moreland, A., Boland, C.R., Goel, A., 2014. Technical factors involved in the measurement of circulating microRNA biomarkers for the detection of colorectal neoplasia. *PLoS One* 9, 1–8.
- Yang, Z., He, M., Wang, K., Sun, G., Tang, L., Xu, Z., 2014. Tumor suppressive microRNA-193b promotes breast cancer progression via targeting DNAJC13



UNIVERSITAS
GADJAH MADA

EKSPRESI miR-193b, miR-222 PLASMA PADA METASTASIS KANKER PAYUDARA Studi Hubungan

terhadap

Urokinase Plasminogen Activator

SHEELLA R BORORING, Prof. dr. Budi Mulyono, MM.,Sp.PK(K); Prof. dr. Sofia Mubarika, M.Med.Sc, Ph.D.; Prof.

Universitas Gadjah Mada, 2018 | Diunduh dari <http://etd.repository.ugm.ac.id/>

and RAB22A. *Int. J. Clin. Exp. Pathol.* 7, 7563–70.

Yoshimoto, N., Toyama, T., Takahashi, S., Sugiura, H., Endo, Y., Iwasa, M., Fujii, Y., Yamashita, H., 2011. Distinct expressions of microRNAs that directly target estrogen receptor α in human breast cancer. *Breast Cancer Res. Treat.* 130, 331–9.

Zaravinos, A., 2015. The Regulatory Role of MicroRNAs in EMT and Cancer. *J. Oncol.* 2015, 865816.

Zhan, D.Q., Wei, S., Liu, C., Liang, B.Y., Ji, G.B., Chen, X.P., Xiong, M., Huang, Z.Y., 2012. Reduced N-cadherin expression is associated with metastatic potential and poor surgical outcomes of hepatocellular carcinoma. *J. Gastroenterol. Hepatol.* 27, 173–80.