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**IDENTIFICATION OF THE BIOFILM PRODUCING CAPACITY AND THE SENSITIVITY PATTERN TO
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OF *Klebsiella pneumoniae* ISOLATED FROM URINE SAMPLES IN RUMAH SAKIT DR. SOERADJI
TIRTONEGORO KLATEN**

FAHRINA FAHRUNNISA, Dr. dr. Hera Nirwati, M. Kes, Sp. MK; dr. Andreanya Meliala, Ph.D., AIFM; dr. Titik Nuryas
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REFERENCES

- Chen, P., Seth, A. K., Abercrombie, J. J., Mustoe, T. A., & Leung, K. P. (2014). Activity of imipenem against *Klebsiella pneumoniae* biofilms in vitro and in vivo. *Antimicrobial agents and chemotherapy*, 58(2), pp. 1208-1213.
- Chung, D.R., Song, J.H., Kim. S.H., Thamlikitkul, V., Huang, S.G., Wang, H., So, T.M., Yasin, R.M., Hsueh, P.R., Carlos, C.C., Hsu, L.Y., Buntaran, L., Lalitha, M.K., Kim, M.J., Choi, J.Y., Kim, S.I., Ko, K.S., Kang, C.I., dan Peck, K. R. (2011). High Prevalence of Multidrug-Resistant Nonfermenters in Hospital-acquired Pneumonia in Asia. *American Journal of Respiratory and Critical Care Medicine*, 184(12).
- Clinical and Laboratory Standards Institute (CLSI). Performance Standards for Antimicrobial Susceptibility Testing: Twenty-Fifth Informational Supplement. CLSI document M100-S25 2015.
- El Bouamri, M., Arsalane, L., El Kamouni, Y. and Zouhair, S. (2015). Antimicrobial susceptibility of urinary *Klebsiella pneumoniae* and the emergence of carbapenem-resistant strains: A retrospective study from a university hospital in Morocco, North Africa. *African Journal of Urology*, 21(1), pp. 36-40.
- Exner, M., Bhattacharya, S., Christiansen, B., Gebel, J., Goroncy-Bermes, P., Hartemann, P., Heeg, P., Ilschner, C., Kramer, A., Larson, E., Merkens, W., Mielke, M., Oltmanns, P., Ross, B., Rotter, M., Schmithausen, R. M., Sonntag, H. G., Trautmann, M. (2017). Antibiotic resistance: What is so special about multidrug-resistant Gram-negative bacteria?. *GMS hygiene and infection control*, 12, Doc05. doi:10.3205/dgkh000290
- Guentzel MN. *Escherichia, Klebsiella, Enterobacter, Serratia, Citrobacter, and Proteus*. In: Baron S, editor. *Medical Microbiology*. 4th edition. Galveston (TX): University of Texas Medical Branch at Galveston; 1996. Chapter 26. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK8035/>
- Hasan, E., Ikram, U.H., Saqib, M., Aizza, Z., dan Muhammad, M.J. (2013). Detection of extended-spectrum β-lactamases in *Klebsiella pneumoniae*: comparison of phenotypic characterization methods. *Pakistan Journal of Medical Sciences*, 29(3), pp. 768-772.
- Hansen, D. S., Aucken, H. M., Abiola, T., & Podschun, R. (2004). Recommended test panel for differentiation of *Klebsiella* species on the basis of a trilateral interlaboratory evaluation of 18 biochemical tests. *Journal of clinical microbiology*, 42(8), pp. 3665-3669.
- Hoiby, N., Ciofu, O., Johansen, H., Song, Z., Moser, C., Jensen, P., Molin, S., Givskov, M., Tolker-Nielsen, T. and Bjarnsholt, T. (2011). The clinical



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impact of bacterial biofilms. *International Journal of Oral Science*, 2011(3), pp.55-65.

Katzung, B., Trevor, A. (2015). *Basic & Clinical Pharmacology*. 13th ed. McGraw Hill Medical.

Lee, C. R., Lee, J. H., Park, M., Park, K. S., Bae, I. K., Kim, Y. B., Cha, C. J., Jeong, B. C., Lee, S. H. (2017). Biology of *Acinetobacter baumannii*: Pathogenesis, Antibiotic Resistance Mechanisms, and Prospective Treatment Options. *Frontiers in cellular and infection microbiology*, 7, 55. doi:10.3389/fcimb.2017.00055

Li, B., Zhao, Y., Liu, C., Chen, Z., and Zhou, D. (2014). Molecular Pathogenesis of *Klebsiella pneumoniae*. *Future Microbiology* 2014, 9(9): pp. 1071-1081.

Madahiah, B.M., Noor, U.S., Abdul, S., dan Ali, A.Q. (2002). *Klebsiella pneumoniae* Urinary Tract Infections Associated with Long-term Catheterization and Spinal Cord Injuries. *Journal of Medical Sciences*, 2, pp. 227-229.

Magiorakos, A.P., Srinivasan, A., Carey, R.B., Carmeli, Y., Falagas, M.E., Giske, C.G., Harbarth, S., Hindler, J.F., Kahlmeter, G., Liljequist, B.O., Paterson, D.L., Rice, L.B., Stelling, J., Struelens, M.J., Vatopoulos, A., Weber, J.T., dan Monnet, D.L. (2011). Multidrug-resistant, extensively drug-resistant and pandrug-resistant bacteria: an international expert proposal for interim standard definitions for acquired resistance. *Clinical Microbiology and Infection*, 18, pp. 268-281.

Mascellino, M.T., Angelis, M.D., dan Oliva, A. (2017). Multi-Drug Resistant Gram-Negative Bacteria: Antibiotic-Resistance and New Treatment Strategies. *Diagnostic Pathology*, 2(2), pp. 1-4.

Masood, M., Saba, N., Samad, A. and Qazilbash, A. (2002). *Klebsiella pneumonia* Urinary Tract Infection Associated with Long-term Catheterization and Spinal Cord Injuries. *Journal of Medical Science*, 2(5-6), pp.227-229.

Maric, S., and Vranes, J. (2007). Characteristics and Significance of Microbial Biofilm Formation. *Periodicum Biologicum*, 109(2).

Moehario, L., Tjoa, E., Kiranasari, A., Ningsih, I., Rosana, Y., & Karuniawati, A. (2009). Trends in antimicrobial susceptibility of Gram-negative bacteria isolated from blood in Jakarta from 2002 to 2008. *The Journal of Infection in Developing Countries*, 3(11), 843-848.
<https://doi.org/https://doi.org/10.3855/jidc.85>



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Moini, A., Soltani, B., Taghavi Ardakani, A., Moravveji, A., Erami, M., Haji Rezaei, M. and Namazi, M. (2015). Multidrug-Resistant *Escherichia coli* and *Klebsiella pneumoniae* Isolated From Patients in Kashan, Iran. *Jundishapur Journal of Microbiology*, 8(10).

Murni, I.K., Duke, T., Daley, A.J., Kinney, S., dan Soenarto, Y. (2016). Antibiotic resistance and mortality in children with nosocomial bloodstream infection in a teaching hospital in Indonesia. *The Southeast Asian journal of tropical medicine and public health*, 47(5), pp. 983-993.

Paczosa, M.K., Mecsas, J. (2016). *Klebsiella pneumoniae*: Going on the Offense with a Strong Defense. *Microbiology and Molecular Biology Review*, 80(3), pp. 629-661.

Patel, I., Patel, V., Thakkar, A., Kothari, V. (2013). Microbial Biofilms: Microbes in Social Mode. *International Journal of Agricultural and Food Research*, pp. 19-34. doi: 10.24102/ijafr.v3i2.499

Piperaki, E.T., Syrigiannopoulos, G.A., Tzouvelekis, L.S., dan Daikos, G.L. (2017). *Klebsiella pneumoniae*: Virulence, Biofilm and Antimicrobial Resistance. *The Pediatric Infectious Disease Journal*, 36(10), pp. 1002-1005.

Podschun, R., Ullmann, U. (1998). *Klebsiella* spp. as Nosocomial Pathogens: Epidemiology, Taxonomy, Typing Methods, and Pathogenicity Factors. *Clinical Microbiology Reviews*, [online] 11(4), pp.589-603. Available at: <https://cmr.asm.org/content/11/4/589> [Accessed 15 Apr. 2018].

Sayeed, M., Latif, N., Mahmood, S. (2017). Hypermucoviscous *Klebsiella* syndrome it's in the community. *Journal of Pakistan Medical Association*, [online] 12(67) pp. 1930-1932. Available at: http://www.jpma.org.pk/full_article_text.php?article_id=8496 [Accessed 5 Nov. 2018].

Santajit, S., Indrawattana, N. (2016). Mechanisms of Antimicrobial Resistance in ESKAPE Pathogens. *Biomed Research International*, 2016, p.8.

Surbhi, L., Christine, L.T., Randall, S.E. (2011). General Principles of Antimicrobial Therapy. *Mayo Clinic Proceedings*, 86(2), pp. 156-167.

Stahlhut, S., Struve, C., Krogfelt, K., Reisner, A. (2012). Biofilm formation of *Klebsiella pneumonia* on urethral catheters requires either type 1 or type 3 fimbriae. *Federation of European Microbiology Societies*, 65, pp.350-359.



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Timothy, J.K., Grant, M., Joana, S., Amy, D., Christian, G.F., Jose, L. I., Rebecca, I., Laura, H., Jose, A.B. (2017). A *Klebsiella pneumoniae* antibiotic resistance mechanism that subdues host defenses and promotes virulence. *EMBO Molecular Medicine*, 9(4), pp. 430-447.

Venezia, S.N., Kondratyeva, K., dan Carattoli, A. (2017). *Klebsiella pneumoniae*: a major worldwide source and shuttle for antibiotic resistance. *FEMS Microbiology Reviews*, 41(3), pp. 252-275.

Vineetha, N., Vignesh, R.A., Sridhar, D. (2015). Preparation, Standardization of Antibiotic Discs and Study of Resistance Pattern for First-Line Antibiotics in Isolates from Clinical Samples. *International Journal of Applied Research 2015*, 1(11): pp. 624-631.

Vuotto, C., Longo, F., Balice, M.P., Donelli, G., and Varaldo, P.E. (2014). Antibiotic Resistance Related to Biofilm Formation in *Klebsiella pneumoniae*. *Pathogens 2014*, 3: pp. 743-758.