

REFERENCES

Originally modified from MMBR 2001; 65:232-60 with permission from ASM Journals

- Acar, J. F. 1997. Consequences of bacterial resistance to antibiotics in medical practice. *Clin. Infect. Dis.* 24:S17-18.
- Acar, J. F., D. H. Bouanchaud, and Y. A. Chabbert. 1977. Evolutionary aspects of plasmid mediated resistance in a hospital environment. In: *Topics in Infectious Diseases; R-Factors: their properties and possible control* (Drews, J. and Hogenauer, G.) vol 2. pp 5-23 Springer-Verlag, Wein-New York.
- Agalar, C., S. Usubutun, and R. Turkyilmaz. 1999. Ciprofloxacin and rifampicin versus doxycycline and rifampicin in the treatment of brucellosis. *Eur. J. Clin. Microbiol. Infect. Dis.* 18:535-538.
- Agerso, Y., L.B. Jensen, M. Givskov, and M.C. Roberts. 2002. The identification of a tetracycline resistance gene *tet(M)*, on a Tn916-like transposon, in the *Bacillus cereus* group. *FEMS Microbiol. Letters.* 214:251-256.
- Akiba, T., K. Koyama, Y. Ishiki, S. Kimura, and T. Fukushima. 1960. On the mechanism of the development of multiple-drug-resistant clones of *Shigella*. *Japan J. Microbiol.* 4:219.
- Alekshum, M.N., and S.B. Levy. 1997. Regulation of chromosomally mediated multiple antibiotic resistance: the *mar* regulation. *Antimicrob. Agents Chemother.* 41: 2067-2075.
- Alonso, A., and J. L. Martinez. 1997. Multiple antibiotic resistance in *Stenotrophomonas maltophilia*. *Antimicrob. Agents Chemother.* 41:2119-2121.
- American Society for Microbiology. 1995. Report of the ASM task force on antibiotic resistance. American Society for Microbiology Supplement to *Antimicrob. Agents Chemother.* 1-23.

- Andersen, S. R., and R. A. Sandaa. 1994. Distribution of tetracycline resistance determinants among gram-negative bacteria isolated from polluted and unpolluted marine sediments. *Appl. Environ. Microbiol.* 60:908-912.
- Andres, M. T., W. O. Chung, M. C. Roberts and J. F. Fierro. 1998. Antimicrobial susceptibilities of *Porphyromonas gingivalis*, *Prevotella intermedia* and *Prevotella nigrescens* isolated in Spain. *Antimicrob. Agents Chemother.* 42:3022-3023.
- Antonio, M. A. D., S. E. Hawes, and S. L. Hillier. 1999. The identification of vaginal *Lactobacillus* species and the demographic and microbiologic characteristics of women colonized by these species. *J. Infect Dis.* 180:1950-1956.
- Aoki, T., T. Satoh, and T. Kitao. 1987. New tetracycline resistance determinant on R-plasmids from *Vibrio anguillarum*. *Antimicrob. Agents Chemother.* 31:1446-1449.
- Atkinson, B. A, A. Abu-Al-Jaibat, and D. J. LeBlanc. 1997. Antibiotic resistance among enterococci isolated from clinical specimens between 1953 and 1954. *Antimicrob. Agents Chemother.* 41:1598-1600.
- Banai, M., and D. J. LeBlanc. 1983. Genetic, molecular, and functional analysis of *Streptococcus faecalis* plasmid pJH1. *J. Bacteriol.* 155:1094-1104.
- Barbosa, T. M., K. P. Scott, and H. J. Flint. 1999. Evidence for recent intergeneric transfer of a new tetracycline resistance gene, *tet(W)*, isolated from *Butyrivibrio fibrisolens*, and the occurrence of *tet(O)* in ruminal bacteria. *Environ. Microbiol.* 1:53-64.
- Barden, T. C., B.L. Buckwalter, R. T. Testa, P. J. Petersen, and V. J. Lee. 1994. "Glycylcyclines" 3. 9-aminodoxycyclinecarboxamides. *J. Med. Chem.* 37:3205-3211.
- Benveniste, R., and J. Davies. 1973. Aminoglycoside antibiotic-inactivation enzymes in actinomycetes similar to those present in clinical isolates of antibiotic resistant bacteria. *Proc. Natl. Acad Sci.* 70:3628-3632.
- Bergeron, J., M. Ammirati, D. Danley, L. James, M. Norcia, J. Retsema, C. A. Strick, W-G Su, J. Sutcliffe, and L. Wondrack. 1996.

Glycylcyclines bind to the high-affinity tetracycline ribosomal binding site and evade Tet(M)- and Tet(O)-mediated ribosomal protection.

Antimicrob. Agents Chemother. 40:2226-2228.

Bertram, J., M. Stratz, and P. Durre. 1991. Natural transfer of conjugative transposon Tn916 between Gram-positive and Gram-negative bacteria. J. Bacteriol. 173:443-448.

Biggs, C. E., P. M. Fratamico. 1999. Molecular characterization of an antibiotic resistance gene cluster of *Salmonella typhimurium* DT104. Antimicrob. Agents Chemother. 43:846-849.

Blackwood, R. K. 1985. Structure determination and total synthesis of the tetracyclines, p.59-136. In J.J. Hlavka and J.H. Boothe (ed.), Handbook of experimental pharmacology, vol. 78. Springer-Verlag K.G., Berlin.

Bolhuis, H., H. W. van Veen, B. Poolman, A. J. M. Driessen, and W. N. Konings. 1997. Mechanisms of multidrug transporters. FEMS Microbiol. Rev. 21:55-84.

Boucher, H. W., C. B. Wennersten, and G. M. Eliopoulos. 2000. In vitro activities of the glycylcycline GAR-936 against gram-positive bacteria. Antimicrob. Agents Chemother. 44:2225-2229.

Bremon, A. R., M. Ruiz-Tovar, B. P. Gorricho, P. D. de Torres, and R. L. Rodriguez. 2000. Non-hospital consumption of antibiotics in Spain: 1987-1997. J. Antimicrob. Chemother. 45:395-400.

Brisson-Noel, A., M. Arthur and P. Courvalin. 1988. Evidence for natural gene transfer from gram-positive cocci to *Escherichia coli*. J. Bacteriol. 170:1739-1745.

Brown, B.A., R.J. Wallace, and G. Onyi. 1996. Activities of the glycylcyclines *N,N*-dimethylglycylamido-minocycline and *N,N*-dimethylglycylamido-6-demethyl-6-deoxytetracycline against *Nocardia* spp. and tetracycline-resistant isolates of rapidly growing mycobacteria. Antimicrob. Agents Chemother. 40:874-878.

- Brown, J. T., and M. C. Roberts. 1987. Cloning and characterization of *tetM* from a *Ureaplasma urealyticum* strain. *Antimicrob. Agents Chemother.* 31:1852-1854.
- Brown, M. B., and M.C. Roberts. 1991. Tetracycline resistance determinants in streptococcal species isolated from the bovine mammary gland. *Vet Microb.* 29:173-180, 1991.
- Bunnag, D., Karbwang J., Na-Bangchang K., Thanavibul A., Chittamas S., and T. Harinasuta. 1996. Quinine-tetracycline for multidrug resistant *falciparum* malaria. *Southeast Asia J. Trop. Med. Public Health* 27:15-18.
- Burdett, V. 1991. Purification and characterization of Tet(M), a protein that renders ribosomes resistant to tetracycline. *J. Biol. Chem.* 266:2872-2877.
- Burdett, V. 1993. tRNA modification activity is necessary for Tet(M)-mediated tetracycline resistance. *J. Bacteriol.* 175:7209-7215.
- Burdett, V. 1996. Tet(M)-promoted release of tetracycline from ribosomes is GTP dependent. *J. Bacteriol.* 178:3246-3251.
- Burns, J. L., C. D. Wadsworthk J. J. Barry, and C. P. Goodall. 1996. Nucleotide sequence analysis of a gene from *Burkholderia (Pseudomonas) cepacia* encoding an outer membrane lipoprotein involved in multiple antibiotic resistance. *Antimicrob. Agents Chemother.* 40:307-313.
- Butler, M. J., E. J. Friend, I. S. Hunter, F. S. Kaczmarek, D. A. Sugden and M. Warren. 1989. Molecular cloning of resistance genes and architecture of a linked gene cluster involved in biosynthesis of oxytetracycline by *Streptomyces rimosus*. *Mol. Gen. Genet.* 215:231-238.
- Buu-Hoi, A., C. Le Bouguenec, and T. Horaud. 1989. Genetic basis of antibiotic resistance in *Aerococcus viridans*. *Antimicrob. Agents Chemother.* 33:529-534.
- Caillaud, F., C. Carlier, and P. Courvalin. 1987. Physical analysis of the conjugative shuttle transposon Tn1545. *Plasmid.* 17:58-60.
- Charpentier, E., G. Gerbaud, and P. Courvalin. 1993. Characterization of a new class of tetracycline-resistance gene *tet(S)* in *Listeria*

monocytogenes BM4210. Gene 131:27-34.

Charpentier, E., G. Gerbaud, and P. Courvalin, P. 1994. Presence of the *Listeria* tetracycline resistance gene *tet(S)* in *Enterococcus faecalis*. Antimicrob. Agents Chemother. 38:2330-2335.

Charpentier, E., and P. Courvalin. 1999. Antibiotic resistance in *Listeria* spp. Antimicrob. Agents Chemother. 43:2103-2108.

Charvalos, E., Y. Tselentis, M. M. Hamzehpour, T. Kohler, and J.-C. Pechere. 1995. Evidence for an efflux pump in multidrug-resistant *Campylobacter jejuni*. Antimicrob. Agents Chemother. 39:2019-2022.

Chaslus-Dancla, E., M.-C. Lesage-Descauses, S. Leroy-Setrin, J.-L. Marel, and J.-P. Lafont. 1995. Tetracycline resistance determinants, Tet B and Tet M detected in *Pasteurella haemolytica* and *Pasteurella multocida* from bovine herds. J. Antimicrob. Chemother. 36:815-819.

Chopra, I. 1985. Mode of action of the tetracyclines and the nature of bacterial resistance to them, p. 315-392. In J.J. Hlavka and J.H. Boothe (ed.), Handbook of experimental pharmacology, vol. 78. Springer-Verlag K.G., Berlin.

Chopra, I. 1986. Transport of tetracyclines into *Escherichia coli* requires a carboxamide group at the C2 position of the molecule. J. Antimicrob. Chemother. 18:661-666.

Chopra, I. 1994. Tetracycline analogs whose primary target is not the bacterial ribosome. Antimicrob. Agents Chemother. 38:637-640.

Chopra, I., P. M. Hawkey, and M. Hinton. 1992. Tetracyclines, molecular and clinical aspects. J. Antimicrob. Chemother. 29:245-277.

Chopra, I., and M.C. Roberts. 2001. Tetracycline antibiotics: Mode of action, applications, molecular biology and epidemiology of bacterial resistance. Microbiol. Mol. Bio. Rev. 65:232-260.

Chung, W.O., J. Gabany, G. R. Persson, and M.C. Roberts. 2002. Distribution of *erm(F)* and *tet(Q)* genes in four oral bacterial species and genotypic variation between resistant and susceptible isolates. J Clin Periodon. 29:152-158.

Chung, W. O., K. Young, Z. Leng, and M. C. Roberts. 1999. Mobile elements carrying *ermF* and *tetQ* genes in Gram-positive and Gram-

negative bacteria. J. Antimicrob. Chemother. 44:329-335.

Chung, W. O.C. Werckenthin, S. Schwarz, and M. C. Roberts. 1999. Host range of the *ermF* rRNA methylase gene in bacteria of human and animal origin. J. Antimicrob. Chemother. 43:5-14.

Clermont, D. O. Chesneau, G. De Cespedes and T. Horaud. 1997. New tetracycline resistance determinants coding for ribosomal protection in streptococci and nucleotide sequence of *tet(T)* isolated from *Streptococcus pyogenes* A498. Antimicrob. Agents Chemother. 41:112-116.

Clewel, D. B., S. E. Flannagan, and D. D. Jaworski. 1995. Unconstrained bacterial promiscuity: the Tn916-Tn1545 family of conjugative transposons. Trends Microbiol. 3:229-236.

Col, N. F. and R. W. O'Connor. 1987. Estimating worldwide current antibiotic usage: Report of task force 1. Rev. Infect. Dis. 9:S232-243.

Committee on drug use in food animals. 1999. The use of drugs in food animals, benefits and risks. National Academy Press, Washington, D.C.

Cunha, B. A. 1999. Doxycycline re-visited. Arch. Int. Med. 159:1006-1007.

Dailidiend, D, M. T. Bertoli, J. Miculeviciene et al. 2002. Emergence of tetracycline resistance in *Helicobacter pylori*: multiple mutational changes in 16S ribosomal DNA and other genetic loci. Antimicrob. Agents Chemother. 46:3940-3946.

Danielsen, M. 2002. characterization of the teracycline resistance plasmid pMD5057 from *Lactobacillus plantarum* 5057 reveals a composite structure. Plasmid. 48:98-103.

Dancer, S. J., P. Shears, and D. J. Platt. 1997. Isolation and characterization of coliforms from glacial ice and water in Canada's high arctic. J. Appl. Microbiol. 82:597-609.

Dantley, K.A., H.K. Dnelly, and V. Burdett. 1998. Binding interaction between Tet(M) and the ribosome: requirements for binding. J. Bacteriol. 180:4089-4092.

- Davey, P.G., R. P. Bax, J. Newey, D . Reeves, D. Rutherford, R. Slack, R. E. Warren, B. Watt, and J. Wilson. 1996. Growth in the use of antibiotics in the community in England and Scotland in 1980-93. *Brit. Med. J.* 312:613.
- Davis, M. A., D. D. Hancock, T. E. Besser, D. H. Rice, J. M. Gay, C. Gay, L. Gearhart, and R. DiGiacomo. 1999. Changes in antimicrobial resistance among *Salmonella enterica* serovar typhimurium isolates from humans and cattle in the northwestern United States, 1982-1997. *Emerg. Infect. Dis.* 5:802-806.
- Dax, S. L. 1997. Antibacterial chemotherapeutic agents. Blackie Academic and Professional, London.
- Debets-Ossenkopp, Y. J., A. J. Herscheid, R.G. J. Pot, E.J. Kuipers, J.G. Kusters, and C. M. J. E. Vandenbroucke-Grauls. 1999. Prevalence of *Helicobacter pylori* resistance to metronidazole, clarithromycin, amoxycillin, tetracycline and trovafloxacin in the Netherlands. *J. Antimicrob. Chemother.* 43:511-515.
- de Barbeyrac, B., B. Dutilh, C. Quentin, H. Renaudin, and C. Bebear. 1991. Susceptibility of *Bacteroides ureolyticus* to antimicrobial agents and identification of a tetracycline resistance determinant related to *tetM*. *J. Antimicrob. Chemother.* 27:721-731.
- DePaola, A., P. A. Flynn, R. M. McPherarson, and S. B. Levy. 1988. Phenotypic and genotypic characterization of tetracycline- and oxytetracycline-resistant *Aeromonas hydrophila* from cultured channel catfish (*Ictalurus punctatus*) and their environments. *Appl. Environ. Microbiol.* 54:1861-1863.
- DePaola, A., W. E. Hill, and F. M. Harrell. 1993. Oligonucleotide probe determination of tetracycline-resistant bacteria isolated from catfish ponds. *Molec. Cell. Probes* 7:345-348.
- DePaola, A., and M. C. Roberts. 1995. Class D and E tetracycline resistance determinants in gram-negative catfish pond bacteria. *Molec. Cell. Probes* 9:311-313.
- De Rossi, E., M. C. J. Blokpoel, R. Cantoni, M. Branzoni, G. Riccardi, D. B. Young, K. A. L. De Set and O. Ciferri. 1998. Molecular cloning and

functional analysis of a novel tetracycline resistance determinant, *tet(V)*, from *Mycobacterium smegmatis*. *Antimicrob. Agents Chemother.* 42:1931-1937.

Dittrich, W., and H. Schrempf. 1992. The unstable tetracycline resistance gene of *Streptomyces lividans* 1326 encodes a putative protein with similarities to translational elongation factors and Tet (M) and Tet (O) proteins. *Antimicrob. Agents Chemother.* 36:1119-1124.

Doern, G. V., A. B. Brueggemann, H. Huynh, E. Wingert and P. Rhombert. 1999. Antimicrobial resistance with *Streptococcus pneumoniae* in the United States, 1997-98. *Emerg. Infect. Dis.* 5:757-765.

Doran, J. L., Y. Pang, K. E. Mdluli, A. J. Moran, T. C. Victor, R. W. Stokes, E. van Helden P.D., M.C. Roberts and F. E. Nano. *Mycobacterium tuberculosis* *efpA* encodes an efflux protein of the QacA transporter family. *Clin. Diagn. Lab. Immunol.* 4:23-32, 1997.

Doyle, D., K. J. McDowall, M. J. Bulter, and I. S. Hunter. 1991. Characterization of an oxytetracycline-resistance gene, *otrA*, of *Streptomyces rimosus*. *Mol. Microbiol.* 5:2923-2933.

Edlind, T. D. 1991. Protein synthesis as a target for antiprotozoal drugs, p.569-586. In G. Coombs and M. North (ed.), *Biochemical protozoology*. Taylor and Francis, London.

Eliopoulos, G. M., C B. Wennersten, G. Cole, and R. C. Moellering. 1994. In vitro activities of two glycyclines against Gram-positive bacteria. *Antimicrob. Agents Chemother.* 38:534-541.

Facinelli, B., M. C. Roberts, E. Giovanetti, C. Casolari, U. Fabio, and P. E. Varaldo. 1993. Genetic basis of tetracycline resistance in food borne isolates of *Listeria innocua*. *Appl. Environm. Microbiol.* 59:614-616.

Falkow, S. 1975. *Infectious multiple drug resistance*. Pion Limited, London, England

Felmingham, D., R. N. Gruneberg, and the Alexander Project Group. 2000. The Alexander Project 1996-1997: latest susceptibility data from this international study of bacterial pathogens from community-acquired lower respiratory tract infections. *J. Antimicrob. Chemother.*

45:191-203.

- Fey, P. D., T. J. Safranek, M. E. Rupp, E. F. Dunne, E. Ribot, P. C. Iwen, P. A. Bradford, f. J. Angulo, and S. H. Hinrichs. 2000. Ceftriaxone-resistant salmonella infection acquired by a child from cattle. *New Eng. J. Med.* 342:1242-1249.
- Finch, R. G. 1997. Tetracyclines, p.469-484. *In* F.O'Grady, H.P.Lambert, R.G. Finch and D. Greenwood (ed.). Antibiotic and chemotherapy. Seventh edition. Churchill Livingstone, New York.
- Fitzgerald, G. F. and D. B. Clewell. 1985. A conjugative transposon (Tn919) in *Streptococcus sanguis*. *Infect Immun.* 47:415-420.
- Flannagan, S. E., L. A. Zitzow, Y. A. Su, and D. B. Clewell. 1994. Nucleotide sequence of the 18-kb conjugative transposon Tn916 from *Enterococcus faecalis*. *Plasmid* 32:350-354.
- Fletcher, H. M., and L. Daneo-Moore. 1992. A truncated Tn916-like element in a clinical isolates of *Enterococcus faecium*. *Plasmid* 27:155-160.
- Fraise, A. P., N. Brenwald, J. M. Andrews, and R. Wise. 1995. In-vitro activity of two glycylcyclines against enterococci resistant to other agents. *J. Antimicrob. Chemother.* 35:877-881.
- Franklin, T. J. (1966). Mode of action of the tetracyclines, p. 192-212 *In* B.A. Newton and and P.E. Reynolds (ed.), Biochemical studies of antimicrobial drugs. Sixteenth symposium of the society for general microbiology. Cambridge University Press, Cambridge.
- Freeman, C. D., C. H. Nightingale, and R. Quintiliani. 1994. Minocycline: old and new therapeutic uses. *Int. J. Antimicrob. Agents* 4:325-335.
- Gales, A. C. and R. N. Jones. 2000. Antimicrobial activity and spectrum of the new glycylcycline, GAR-936 tested against 1,203 recent clinical bacterial isolates. *Diagn Microb Infect Dis.* 36:19-36.
- Galimand, M., A. Guiyoule, G. Gerbaud, B. Rasoamanana, S. Chanteau, E. Carniel, and P. Courvalin. 1997. Multidrug resistance in *Yersinia pestis* by a transferable plasmid. *New Eng. J. Med.* 337:677-680.

George, A. M., R. M. Hall, and H. W. Stokes. 1995. Multidrug resistance in *Klebsiella pneumoniae*: a novel gene, *ramA*, confers a multidrug resistance phenotype in *Escherichia coli*. *Microbiol.* 141:1909-1920.

Georgetown University's Center for Food and Nutrition Policy 1999. Antibiotic use in animals: food safety and risk assessment. Conference proceedings, May 27th 1999. Georgetown University, Washington, DC.

Gillespie, M. T., B. R. Lyon, L. S. L. Loo, P. R. Mathews, P. R. Stewart, and R. A. Skurray. 1987. Homologous direct repeat sequences associated with mercury, methicillin, tetracycline and trimethoprim resistance in *Staphylococcus aureus*. *FEMS Microbiol. Lett.* 43:165-171.

Gillespie, M. T., J. W. May, and R. Skurray. 1986. Detection of an integrated tetracycline resistance plasmid in the chromosome of methicillin-resistant *Staphylococcus aureus*. *J. Gen. Microbiol.* 132:1723-1728.

Goldstein, F. W., M. D. Kitzis, and J. F. Acar. 1994. N,N-dimethylglycyl-amido derivative of minocycline and 6-demethyl-6-deoxytetracycline, two new glycylcyclines highly effective against tetracycline-resistant gram-positive cocci. *Antimicrob. Agents Chemother.* 38:2218-2220.

Gottohs, N., H. Tsujimoto, K. Poole, J-I. Yamagishi, and T. Nishino. 1995. The outer membrane protein OprM of *Pseudomonas aeruginosa* is encoded by *oprK* of the *mexA-mexB-oprK* multidrug resistance operon. *Antimicrob. Agents Chemother.* 39:2567-2569

Graeme, K. A., and C. V. Pollack. 1996. Antibiotic use in the emergency department. II. The aminoglycosides, macrolides, tetracyclines. Sulfa drugs, and urinary antiseptics. *J. Emergency Med.* 14:361-371.

Grave K, E. Lingaas, M. Bangen and M. Ronning. 1999. Surveillance of the overall consumption of antibacterial drugs in humans, domestic animals and farmed fish in Norway in 1992 and 1996. *J. Antimicrob. Chemother.* 43:243-252.

Guay, G. G., M. Tuckman, and D. M. Rothstein. 1994. Mutations in the *tetA(B)* gene that cause a change in substrate specificity of the tetracycline efflux pump. *Antimicrob. Agents Chemother.* 38:857-860.

- Gustafson, R. H., and J. S. Kiser. 1985. Nonmedical uses of the tetracyclines, p.405-446. In J.J. Hlavka and J.H. Boothe (ed.), Handbook of Experimental Pharmacology, vol. 78. Springer-Verlag, K.G. Berlin.
- Hamilton-Miller, J. M. T., and S. Shah. 1996. Activity of glycylcyclines CL 329998 and CL 331002 against minocycline-resistant and other strains of methicillin-resistant *Staphylococcus aureus*. J. Antimicrob. Chemother. 37:1171-1175.
- Hartley, D. L., K. R. Hones, J. A. Tobian, D. J. LeBlanc and F. L. Macrina. 1984. Disseminated tetracycline resistance in oral streptococci: Implication of a conjugative transposon. Infect Immun. 45:13-17.
- Hansen, L. M, L. M. McMurry, S. B. Levy, and D. C. Hirsch. 1993. A new tetracycline resistance determinant, Tet H, from *Pasteurella multocida* specifying active efflux of tetracycline. Antimicrob. Agents Chemother 37:2699-2705.
- Hatsu, M., T. Sasaki, S. Gomi, Y. Kodama, M. Sezaki, S. Inouye, and S. Kondo. 1992. A new tetracycline with antitumor activity; II the structural elucidation of SF2575. J. Antibiot. 45:325-330.
- Hawley, R. J., L. N. Lee and D. J. LeBlanc. 1980. Effects of tetracycline on the streptococcal flora of periodontal pockets. Antimicrob. Agents Chemother. 17:372-378.
- Heur, C., R. K. Hickman, M. S. Curiale, W. Hillen, and S. B. Levy. 1987. Constitutive expression of tetracycline resistance mediated by a *Tn10*-like element in *Haemophilus parainfluenzae* results from a mutation in the repressor gene. J. Bacteriol. 169:990-994.
- Higlander, S. K., and R. P. Novick. 1990. Mutational and physiological analyses of plasmid pT181 functions expressing incompatibility. Plasmid 23:1-15.
- Hillen, W., and C. Berens. 1994. Mechanisms underlying expression of *Tn10* encoded tetracycline resistance. Annu. Rev. Microbiol. 48:345-369.
- Hlavka, J. J., G. A. Ellestad, and I. Chopra. 1992. Tetracyclines. In: Kirk-Othmer Encyclopedia of Chemical Technology, 4th ed, Volume 3.,

p.331-346. John Wiley and Sons, Inc., New York.

Holmberg, S. D., M. T. Osterholm, K. A. Senger, and M. L. Cohen. 1984. Drug-resistant *Salmonella* from animals fed antimicrobials. N. Engl. J. Med. 311:617.

Holmberg, S. D., J. G. Wells, and M. L. Cohen. 1984. Animal-to-man transmissions of antimicrobial-resistant *Salmonella*: investigation of US outbreaks, 1971-1983. Science 225:833-835.

Horard, T., G. de Cerspedes, D. Clermont, F. David, and F. Delbos. 1991. Variability of chromosomal genetic elements in streptococci. In: Genetics and molecular biology of streptococci, lactococci and enterococci. (G.M. Dunny, P.P. Cleary, and L.L. McKay. Eds.). p. 16-20. American Society for Microbiology, Washington D.C.

Hosek, G., D. D. Leschinksy, S. Irons, and T. J. Safranek. 1997. Multidrug-resistant *Salmonella* serotype Typhimurium-United States, 1996. Morbid. Mortal. Weekly Rep. 46:308-310.

Huang, R., D. M. Gascoyne-Binzi, P. M. Hawkey, M. Yu, J. Heritage, and A. Eley. 1997. Molecular evolution of the *tet(M)* gene in *Gardnerella vaginalis*. J. Antimicrob. Chemother. 40:561-565.

Hughes, V. M., and N. Datta. 1983. Conjugative plasmids in bacteria of the 'pre-antibiotic' era. Nature 302:725-726.

Humbert, P., P. Treffel, J.-F Chapuis, S. Buchet, C. Derancourt, and P. Agache. 1991. The tetracyclines in dermatology. J. Am. Acad. Dermat. 25:691-697.

Inamine J. M., and V. Burdett. 1985. Structural organization of a 67-kilobase streptococcal conjugative element mediating multiple antibiotic resistance. J. Bacteriol. 161:620-626.

Institute of Medicine, Division of Health Promotion and Disease Prevention. 1998. Report of a study. Human health risks with the subtherapeutic use of penicillin or tetracyclines in animal feed. National Academy Press, Washington, D.C.

Iwaki, S., N. Tamura, T. Kimura-Someya, S. Nada, and A. Yamaguchi. Cysteine-scanning mutagenesis of transmembrane segments 4 and 5 of the Tn10-encoded metal-tetracycline/H⁺ antiporter reveals a permeability barrier in the middle of a transmembrane water-filled channel. *J. Biolog. Chem.* 275:22704-22712.

Jahn, G., R. Laufs, P-M. Kaulfers, and H. Kolenda. 1979. Molecular nature of two *Haemophilus influenzae* R factors containing resistance and the multiple integration of drug resistance transposons. *J. Bacteriol.* 138:584-597.

Janknegt, R., A.O. Lashof, I.M. Gould, and J.W.M. van der Meer. 2000. Antibiotic use in Dutch hospitals 1991-1996. *J. Antimicrob. Chemother.* 45:251-256.

Johnson, A. P. 2000. GAR-936. *Curr. Opin. Anti-infective Invest. Drugs* 2:164-170.

Jones, C. E., S. Vyakrnam, E. A. Eady, J. H. Cove, and W. J. Cunliffe. 1996. Antibiotic resistant propionibacteria and acne: crisis or conundrum? *J. Investig. Dermatol.* 108:381.

Jones, C. S., D. J. Osborne, and J. Stanley. 1992. Enterobacterial tetracycline resistance in relation to plasmid incompatibility. *Molec. Cell. Probes* 6:313-317.

Jones, C. S., D. J. Osborne, and J. Stanley. 1992. Cloning of a probe for a previously undescribed enterobacterial tetracycline resistance gene. *Lett. Appl. Microb.* 15:106-108.

Jones, R. B., B. Van Der Pol, B. F. Batteiger. 1990. Prevalence of heterotypic tetracycline resistance among isolates of *C. trachomatis* from selected populations. Abstract 679. In: Program and Abstracts of the 30th Interscience Conference on Antimicrobial Agents and Chemotherapy. p. 199. Washington D.C., American Society for Microbiology.

Joshi, N., and D. Q. Miller. 1997. Doxycycline revisited. *Arch. Intern. Med.* 157:1421-1428.

Ji, B., S. Sow, E. Perani, C. Lienhardt, V. Diderot, and J. Grosset. 1998. Bactericidal activity of a single-dose combination of ofloxacin plus

minocycline, with or without rifampin, against *Mycobacterium leprae* in mice and in lepromatous patients. *Antimicrob. Agents Chemother.* 42:1115-1120.

Kariuki, S., N. B. Mirza, Y. Wasteson, D. Senerwa, J. M. Gathuma, and O. Olsvik. 1992. Tetracycline resistance genes in Kenyan hospital isolates of *Salmonella typhimurium*. *APMIS* 100:629-634.

Kauc, L., and S. H. Goodgal. 1989. Introduction of transposon Tn916 DNA into *Haemophilus influenzae* and *Haemophilus parainfluenzae*. *J. Bacteriol.* 171:6625-6628.

Kehrenberg, C, C. Werckenthin, and S. Schwarz. 1998. Tn5706, a transposon-like element from *Pasteruella multocida* mediating tetracycline resistance. *Antimicrob. Agents Chemother.* 42:2116-2118.

Kenny, G. E., and F. D. Cartwright. 1994. Susceptibilities of *Mycoplasma hominis*, *Mycoplasma pneumoniae* and *Ureaplasma urealyticum* to new glycylcyclines in comparison with those to older tetracyclines. *Antimicrob. Agents Chemother.* 38:2628-2632.

Khan, S. A., and R. P. Novick. 1983. Complete nucleotide sequence of pT181, a tetracycline resistance plasmid from *Staphylococcus aureus*. *Plasmid* 30:163-166..

Khachatourians G. G. 1998. Agricultural use of antibiotics and the evolution and transfer of antibiotic-resistant bacteria. *Can Med Ass.* 159:1129-1136.

Kimura, T., M. Suzuki, T. Sawai, and A. Yamaguchi. 1996. Determination of a transmembrane segment using cysteine-scanning mutants of transposon Tn10-encoded metal-tetracycline/H⁺ antiporter. *Biochemistry* 35:15896-15899.

Kimura, T., M. Ohnuma, T. Sawai, and A, Yamaguchi. 1997. Membrane topology of the transposon 10-encoded metal-tetracycline/H⁺ antiporter as studied by site-directed chemical labeling. *J. Biol. Chem.* 272:580-585.

Kimura-Someya, T., S. Iwaki, and A. Yamaguchi (1998). Site-directed chemical modification of cysteine-scanning mutants as to transmembrane

segment II and its flanking regions of the Tn10-encoded metal-tetracycline/H⁺ antiporter reveals a transmembrane water-filled channel. J. Biol. Chem. 273:32806-32811.

Kimura-Someya, T., S. Iwaki, S. Konishi, N. Tamura, Y. Kubo, and A. Yamaguchi. 2000. Cysteine-scanning mutagenesis around transmembrane segments 1 and 11 and their flanking loop regions of Tn10-encoded metal-tetracycline/H⁺ antiporter. J. Biol. Chem. 275:18692-18697.

Kisker, C., W. Hinrichs, K. Tovar, W. Hillen, and W. Saenger. 1995. The complex formed between Tet repressor and tetracycline-Mg²⁺ reveals mechanism of antibiotic resistance. J. Mol. Biol. 247:260-280.

Klein, N. C., and B. A. Cunha. 1995. Tetracyclines. Med. Clin. N. Amer. 79:789-801.

Knapp, J. S., S. R. Johnson, J. M. Zenilman, M. C. Roberts, and S. A. Morse. 1988. High-level tetracycline resistance resulting from TetM in strains of *Neisseria* species, *Kingella denitrificans*, and *Eikenella corrodens*. Antimicrob. Agents Chemother. 32:765-767.

Kobland, J. D., G. O. Gale, R. H. Gustafson, and K. L. Simkins. 1987. Comparison of therapeutic versus subtherapeutic levels of chlortetracycline in the diet for selection of resistant *Salmonella* in experimentally challenged chickens. Poultry Sci. 66:1129-1137.

Konishi, S., S. Iwaki, T. Kimura-Someya, and A. Yamaguchi. 1999. Cysteine-scanning mutagenesis around transmembrane segment VI of Tn10-encoded metal-tetracycline/H⁺ antiporter. FEBS Lett. 461:315-318.

Kordick, D. L., M. G. Papich, and E. B. Breitschwerdt. 1997. Efficacy of enrofloxacin or doxycycline for treatment of *Bartonella henselae* or *Bartonella clarridgeiae* infection in cats. Antimicrob. Agents Chemother. 41:2448-2455.

Kiser, J. S. (1976). A perspective on the use of antibiotics in animal feeds. J. Anim. Sci. 42:1058-1072.

Kucers, A., and N. McK. Bennett. 1987. The use of antibiotics. Fourth Edition. Heinemann Medical, Oxford.

Kwon, D.H., J.J. Kim, M. Lee, Y. Yamaoka, M. Kato, M.S. Osato, F.A.K. El-Zaatari, and D.Y. Graham. 2000. Isolation and characterization of tetracycline-resistant clinical isolates of *Helicobacter pylori*. Antimicrob. Agents Chemother. 44:3203-3205.

- Lacroix, J-M., and C. B. Walker. 1993. Detection and incidence of the tetracycline resistance determinant *tet(M)* in the microflora associated with adult periodontitis. *J. Periodont.* 66:102-108.
- Le Bouguenec C., G. de Cespedes, and T. Horaud. 1988. Presence of chromosomal elements resembling the composite structure *Tn3701* in streptococci. *J. Bacteriol.* 172:727-734.
- Lee, C., B. E. Langlois, and K. L. Dawson. 1993. Detection of tetracycline resistance determinants in pig isolates from three herds with different histories of antimicrobial agent exposure. *Appl. Environ. Microbiol.* 59:1467-1472.
- Lefevre, F. C., J. P. Lepargneur, D. Guion, and S. Bei. 1997. Tetracycline-resistant *Chlamydia trachomatis* in Toulouse, France. *Path. Biol.* 45:376-378.
- Leng, Z., D. E. Riley, R. E. Berger, J. N. Krieger, and M. C. Roberts. 1997. Distribution and mobility of the tetracycline resistant determinant Tet Q. *J. Antimicrob. Chemother.* 40:551-559.
- Levy, S. B. 1984. Resistance to the tetracyclines, p.191-240. *In* L.E. Bryan (ed.), *Antimicrobial drug resistance*. Academic Press, Orlando.
- Levy, S. B. 1988. Tetracycline resistance determinants are widespread. *ASM News* 54:418-421.
- Levy, S. B. 1992. The antibiotic paradox: how miracle drugs are destroying the miracle. Plenum Press, New York.
- Levy, S. B. 1992. Active efflux mechanisms for antimicrobial resistance. *Antimicrob. Agents Chemother.* 36:695-703.
- Levy, S. B., G. B. Fitzgerald, and A. B. Macone. 1976. Changes in intestinal flora of farm personnel after introduction of a tetracycline-supplemented feed on a farm. *N. Engl. J. Med.* 295:583-588.
- Levy, S. B., A. Buu-Hoi, and B. Marshall. 1984. Transposon *Tn10*-like tetracycline resistance determinants in *Haemophilus parainfluenzae*. *J. Bacteriol.* 160:87-94.
- Levy, S. B., L. M. McMurry, T. M. Barbosa, V. Burdett, P. Courvalin, W. Hillen, M. C. Roberts, J. I. Rood, and D. E. Taylor. 1999. Nomenclature

for new tetracycline resistance determinants. *Antimicrob. Agents Chemother.* 43:1523-1524.

Levy, S. B., L. M. McMurry, V. Burdett, P. Courvalin, W. Hillen, M. C. Roberts and D. E. Taylor. 1989. Nomenclature for tetracycline resistance determinants. *Antimicrob. Agents Chemother.* 33:1373-1374.

Li, L-Y, N. B. Shoemaker, and A. A. Salyers. 1995. Location and characteristics of the transfer region of *Bacteriodes* conjugative transposon and regulation of transfer genes. *J. Bacteriol.* 177:4992-4999.

Li, X-Z., D. M. Livermore, and H. Nikaido. 1994. Role of efflux pumps in intrinsic resistance of *Pseudomonas aeruginosa*: resistance to tetracycline, chloramphenicol and norfloxacin. *Antimicrob. Agents Chemother.* 38:1732-1741.

Li, X-Z., H. Nikaido, and K. Poole. 1995. Role of mexA-mexB-OprM in antibiotic efflux in *Pseudomonas aeruginosa*. *Antimicrob. Agents Chemother.* 39:1948-1953.

Lima, A. A. M., N. L. Lima, M. C. Pinho, E. A. Barros Jr., M. J. Teixeria, M. C. V. Marins, and R. I. Guerrant. 1995. High frequency of strains multiply resistant to ampicillin, trimethoprim-sulfamethoxazole, streptomycin, chloramphenicol, and tetracycline isolated from patients with shigellosis in northeastern Brazil during the period 1988 to 1993. *Antimicrob. Agents Chemother.* 39:256-259.

Lacks , S. A. P. Lopez, B. Greenberg, and M. Espinosa. 1986. Identification and analysis of genes for tetracycline resistance and replication functions in the broad-host-range plasmid pSL1. *J. Mol. Biol.* 192:753-765.

Lina, G, A. Quaglia, M-E. Reverdy, R. LeClercq, F. Vandenesch and J. Etienne. 1999. Distribution of genes encoding resistance to macrolides, lincosamides and streptogramins among staphylococci. *Antimicrob. Agents Chemother.* 43:1062-1066.

Linton, A. H. 1984. Antibiotic-resistant bacteria in animal husbandry. *Br. Med. Bull.* 40:91-95.

Liss, R. H., and F. R. Batchelor. 1987. Economic evaluations of antibiotic use and resistance – a perspective: report of task force 6. *Rev. Infect. Dis.* 9, Suppl. 3:S297-S312.

- Louie, M., L. Louie, G. Papia, J. Talbot, M. Lovgren, and A. E. Simor. 1999. Molecular analysis of the genetic variation among penicillin-susceptible and penicillin-resistant *Streptococcus pneumoniae* serotypes in Canada. *J. Infect Dis.* 179:892-900.
- Lucas, C. E., J. T. Balthazar, K. E. Hagman and W. M. Shager. 1997. The MtrR repressor binds the DNA sequence between the *mtrR* and the *mtrC* genes in *Neisseria gonorrhoeae*. *J. Bacteriol.* 179:4123-4128.
- Luna, V. A. and M. C. Roberts. 1998. The presence of the *tetO* gene in a variety of tetracycline resistant *Streptococcus pneumoniae* serotypes from Washington State. *J. Antimicrob. Chemother.* 42:613-619.
- Luo, Z-Q, and S. K. Farrand. 1999. Cloning and characterization of a tetracycline resistance determinant present in *Agrobacterium tumefaciens* C58. *J. Bacteriol.* 181:618-626.
- Lyras, D. and J. I. Rood. 1996. Genetic organization and distribution of tetracycline resistance determinants in *Clostridium perfringens*. *Antimicrob. Agents Chemother.* 40: 2500-2504.
- Manavathu, E. K., C. L. Fernandez, B. S. Cooperman, and D. E. Taylor. 1990. Molecular studies on the mechanism of tetracycline resistance mediated by Tet(O). *Antimicrob. Agents Chemother.* 34:71-77.
- Manganelli, R., L. Romano, S. Ricci, M. Zazzi, and G. Pozzi. 1995. Dosage of Tn916 circular intermediates in *Enterococcus faecalis*. *Plasmid* 34:48-57.
- Manie, T., S. Khan, V.S. Brozel, W. J. Veith, and P. A. Gouws. 1998. Antimicrobial resistance of bacteria isolated from slaughtered and retail chickens in South Africa. *Lett. Appl. Microbiol.* 26:253-258.
- Marshall, B., M. Roberts, A. Smith, and S. B. Levy. 1984. Homogeneity of tetracycline-resistance determinants in *Haemophilus* species. *J. Infect. Dis.* 149:1028-1029.
- Marshall, B., C. Tachibana, and S. B. Levy. 1983. Frequency of tetracycline resistance determinant classes among lactose-fermenting coliforms.

Antimicrob. Agents Chemother. 24:835-840.

Martinez-Salazar, J. M., G. Alvarez, and M. C. Gomez-Eichelmann. 1986. Frequency of four classes of tetracycline resistance determinants in *Salmonella* and *Shigella* spp. clinical isolates. Antimicrob. Agents Chemother. 30:630-631.

Maurin, M., and D. Raoult. 1999. Q fever. Clin. Microbiol. Rev. 12:518-553.

McCaig, L. F. and J. M. Hughes. 1995. Trends in antimicrobial drug prescribing among office-based physicians in the United States. JAMA 273:214-219.

McMurry, L.M., and S.B. Levy. 2000. Tetracycline resistance in Gram-positive bacteria. p. 660-677. In V.A. Fischetti, R.P. Novick, J.J. Ferretti, D.A. Portnoy, J.I. Rood (eds). Gram-positive Pathogens. American Society of Microbiology, Washington, D.C.

McNicholas, P., I. Chopra, and D.M. Rothstein 1992. Genetic analysis of the TetA(C) gene on plasmid pBR322. J. Bacteriol. 174:7926-7933.

McNicholas, P., M. McGlynn, G. G. Guay, and D. M. Rothstein. 1995. Genetic analysis suggests functional interactions between the N- and C-terminal domains of the TetA(C) efflux pump encoded by pBR322. J. Bacteriol. 177:5355-5357.

Mendez, B., C. Tachibana, and S. B. Levy. 1980. Heterogeneity of tetracycline resistance determinants. Plasmid 3:99-108.

Midolo, P.D, M.G. Korman, J.D. Turnidge and J.R. Lambert. 1996. *Helicobacter pylori* resistance to tetracycline. Lancet 347:1194-1195.

Miller, D. J. S. 1999. A perspective on the global use of antibacterials for disease control in food producing species and current issues of clinical resistance. In Programme and Abstracts of the conference "Antibacterial Resistance, Debating Animal and Human Health Issues", London, May 1999. International Business Communications, London.

Mitscher, L. A. 1978. The chemistry of the tetracycline antibiotics. Marcel Dekker Inc., New York.

Moazed, D., and H. F. Noller. 1987. Interaction of antibiotics with functional sites in 16S ribosomal RNA. Nature 327:389-394.

Molbak, K., D. L. Baggesen, F. M. Aarestrup, J. M. Ebbesen, J. Engberg, K. Frydendahl, P. Gerner-Smidt, A. M. Petersen, and H. C. Wegener.

1999. An outbreak of multidrug-resistant, quinolone-resistant *Salmonella enterica* serotype Typhimurum DT104. *New Eng. J. Med.* 341:1420-1425.

Morse, S. A., S. J. Johnson, J. W. Biddle, and M. C. Roberts. 1986. High-level tetracycline resistance in *Neisseria gonorrhoeae* due to the acquisition of the *tetM* determinant. *Antimicrob. Agents Chemother.* 30:664-670.

Naglich, J. G., and R. E. Andrews, Jr. 1988 Tn916-dependent conjugal transfer of pC194 and pUB110 from *Bacillus subtilis* into *Bacillus thuringiensis* subsp. *israelensis*. *Plasmid* 20:113-126.

Needham, C., M. Rahman, K. G. H. Dyke, and W. C. Noble. 1994. An investigation of plasmids from *Staphylococcus aureus* that mediate resistance to mupirocin and tetracycline. *Microbiol.* 140:2577-2583.

Nelson, M., W. Hillen, and R. A. Greenwald (eds). 2001. *Tetracyclines in Biology, Chemistry and Medicine*. Birkhauser Verlag, Basel, Switzerland. ISBN-3-7643-6282-0.

Nelson, M. L., B. H. Park, J. S. Andrew, V. A. Georgian, B. C. Thomas, and S. B. Levy. 1993. Inhibition of the tetracycline efflux antiport protein by 13-thio-substituted 5-hydroxy-6-deoxytetracyclines. *J. Med. Chem.* 36:370-377.

Nelson, M. L., and S. B. Levy. 1999. Reversal of tetracycline resistance mediated by different bacterial tetracycline resistance determinants by an inhibitor of the Tet(B) antiport protein. *Antimicrob. Agents Chemother.* 43:1719-1724.

Nelson, W. L., J. N. Kuritsky, D. L. Kennedy, and C. S. Lao. 1987. Outpatient (outpt) pediatric antibiotic use in the US: trends and therapy for otitis media (OM) 1977-1986. Abstr. 455 p. 175. *In* Program and abstracts of the 27th Interscience Conference on antimicrobial Agents and Chemotherapy. American Society for Microbiology, Washington, D.C.

Nesin, M., P. Svec, J. R. Lupski, G. N. Godson, B. Kreiswirth, J. Kornblum, and S. J. Projan. 1990. Cloning and nucleotide sequence of a chromosomally encoded tetracycline resistance determinant, *tetA(M)*, from a pathogenic, methicillin-resistant strain of *Staphylococcus*

aureus. Antimicrob. Agents Chemother. 34:2273-2276.

Ng, L-K, M. R. Mulvery, I. Martin, G. A. Peters, and W. Johnson. 1999. Genetic characterization of antimicrobial resistance in Canadian isolates of *Salmonella* serovar typhimurium DT104. Antimicrob. Agents Chemother. 43:3018-3021.

Nikaido, H. 1998. Multidrug efflux pumps of Gram-negative bacteria. J. Bacteriol. 178:5853-5859.

Nikaido, H. 1998. Multiple antibiotic resistance and efflux. Cur Opin Microbiol. 1:516-523.

Nikaido, H., and D.G. Thanassi. 1993. Penetration of lipophilic agents with multiple protonation sites into bacterial cells: tetracyclines and fluoroquinolones as examples. Antimicrob. Agents Chemother. 37:1393-1399.

Noah, J. W., M. A. Dolan, P. Babin, and P. Wollenzien. 1999. Effects of tetracycline and spectinomycin on the tertiary structure of ribosomal RNA in the *Escherichia coli* 30S ribosomal subunit. J. Biol. Chem. 274:16576-16581.

Nord, C. E., A. Lindmark, and I. Persson. 1993. In vitro activity of DMG-Mino and DMG-DM Dot, two new glycylcyclines, against anaerobic bacteria. Eur. J. Clin. Microbiol. Infect. Dis. 12:784-786.

O'Brien, T. F., and the Members of Task Force 2. 1987. Resistance of bacteria to antibacterial agents: report of task force 2. Rev. Infect. Dis. 9:S244-S260.

Oehler, R., N. Polacek, G. Steiner and A. Barta. 1997. Interaction of tetracycline with RNA: photoincorporation into ribosomal RNA of *Escherichia coli*. Nucl. Acids Res. 25:1219-1224.

Oethinger, M., W. V. Kern, A. S. Jellen-Ritter, L. M. McMurry and S. B. Levy. 2000. Ineffectiveness of topoisomerase mutations in mediating clinically significant fluoroquinolone resistance in *Escherichia coli* in the absence of the AcrAB efflux pump. Antimicrob. Agents Chemother. 44:10-13.

Oliva, B., and I. Chopra. 1992. Tet determinants provide poor protection against some tetracyclines: further evidence for division of tetracyclines

into two classes. *Antimicrob. Agents Chemother.* 36:876-878.

Oliva, B., G. Gordon, P. McNicholas, G. Ellestad, and I. Chopra. 1992. Evidence that tetracycline analogs whose primary target is not the bacterial ribosome cause lysis of *Escherichia coli*. *Antimicrob. Agents Chemother.* 36:913-919.

Olsvik, B., I. Olsen, and F. C. Tenover. 1994. Tet *tet*(Q) gene in bacteria isolated from patients with refractory periodontal disease. *Oral. Microbiol. Immunol.* 9:251-255.

Olsvik, B., I. Olsen, and F. C. Tenover. 1995. Detection of *tet*(M) and *tet*(O) using the polymerase chain reaction in bacteria isolated from patients with periodontal disease. *Oral Microbiol. Immunol.* 10:87-92.

Orth, P., D. Schnappinger, P-E. Sum, G.A. Ellestad, W. Hillen, W. Saenger, and W. Hinrichs. 1999. Crystal structure of the Tet repressor in complex with a novel tetracycline, 9-(*N,N*-dimethylglycylamido)-6-demethyl-6-deoxytetracycline. *J. Mol. Biol.* 285:455-461.

Orth, P., D. Schnappinger, W. Hillen, W. Saenger, and W. Hinrichs. 2000. Structural basis of gene regulation by the tetracycline inducible Tet repressor-operator system. *Nature Struct. Biol.* 7:215-219.

Ouellette, M. and C. Kundig. 1997. Microbial multidrug resistance. *Internat. J. Antimicrob. Agents.* 8:179-187.

Paulsen, I. T., M. H. Brown, and R. A. Skurray. 1996. Proton-dependent multidrug efflux systems. *Microbiol. Rev.* 60:575-608.

Pang, Y., T. Bosch, T., and M. C. Roberts. 1994. Single polymerase chain reaction for the detection of tetracycline resistant determinants Tet K and Tet L. *Molec. Cell. Probes* 8:417-422.

Pang, Y., B. A. Brown, V. A. Steingrube, and R. J. Wallace, Jr., and M. C. Roberts. 1994. Acquisition of gram-positive tetracycline resistance genes in *Mycobacterium* and *Streptomyces* species. *Antimicrob. Agents Chemother.* 38:1408-1412.

Petersen, P. J., N. V. Jacobus, W. J. Weiss, P. E. Sum, and R. T. Testa. 1999. In vitro and in vivo antibacterial activities of a novel glycylcycline, the 9-*t*-butylglycylamido derivative of minocycline (GAR-936). *Antimicrob. Agents Chemother.* 43:738-744.

- Poyart, C., J. Celli and P. Trieu-Cuot. 1995. Conjugative transposition of Tn916-related elements from *Enterococcus faecalis* to *Escherichia coli* and *Pseudomonas fluorescens*. *Antimicrob. Agents Chemother.* 39:500-506.
- Poyart, C., G. Quesne, P. Acar, P. Berche, and P. Trieu-Cuot. 2000. Characterization of the Tn916-like transposon Tn3872 on a strain of *Abiotrophia defectiva* (*Streptococcus defectivus*) causing sequential episodes of endocarditis in a child. *Antimicrob. Agents Chemother.* 44:790-793.
- Pradines, B., A. Spiegel, C. Rogier, A. Tall, J. Mosnier, T. Fusai, J.F. Trape, D. Parzy. 2000. Antibiotics for prophylaxis of *Plasmodium falciparum* infections: in vitro activity of doxycycline against Senegalese isolates. *Am. J. Trop. Med. Hyg.* 62: 82-85.
- Projan, S. J., M. Monod, C. S. Narayanan, and D. Dubnau. 1987. Replication properties of pIM13, a naturally occurring plasmid found in *Bacillus subtilis*, and of its close relative pE5, a plasmid native to *Staphylococcus aureus*. *J. Bacteriol.* 169:5131-5139.
- Projan, S. J., and R. Novick. 1988. Comparative analysis of five related staphylococcal plasmids. *Plasmid* 19:203-221.
- Pukrittayakamee, S., A. Chantra, S. Vanijanonta, R. Clemens, S. Looareesuwan, and N.J. White. 2000. Therapeutic responses to quinine and clindamycin in multidrug-resistant falciparum malaria. *Antimicrob. Agents Chemother.* 44:2395-2398.
- Rasmussen, B. A., Y. Gluzman, and F. P. Tally. 1994. Inhibition of protein synthesis occurring on tetracycline-resistant, TetM-protected ribosomes by a novel class of tetracyclines, the glycyclines. *Antimicrob. Agents Chemother.* 38:1658-1660.
- Recchia G. D., and R. M. Hall. 1995. Gene cassettes: a new class of mobile element. *Microbiol.* 141:3015-3027.
- Report of the joint expert advisory committee on antibiotic resistance (JETACAR). 1999. The use of antibiotics in food-producing animals: antibiotic-resistant bacteria in animals and humans. Commonwealth Department of Health and Aged Care and Commonwealth Department of Agriculture, Fisheries and Forestry – Australia.
- Reynes, J. P., T. Calmels, D. Drocourt, and G. Tiragy. 1988. Cloning, expression in *Escherichia coli* and nucleotide sequence of a tetracycline-

resistance gene from *Streptomyces rimosus*. J. Gen. Microbiol. 134:585-598.

Rice, L. B., S. H. Marshall, and L. L. Carias. 1992. Tn5381, a conjugative transposon identifiable as a circular form in *Enterococcus faecalis*. J. Bacteriol. 174:7380-7315.

Ridenhour, M. B., H. M. Fletcher, J. E. Mortensen, and L. Daneo-Moore. 1996. A novel tetracycline-resistant determinant, *tet(U)*, is encoded on the plasmid pKQ10 in *Enterococcus faecium*. Plasmid 35:71-80.

Riesbeck, K., A. Bredberg, and A. Forsgren. 1990. Ciprofloxacin does not inhibit mitochondrial functions but other antibiotics do. Antimicrob. Agents Chemother. 34:167-169.

Roberts, M. C. 1989. Gene transfer in the urogenital and respiratory tract. In: Gene Transfer in the Environment (Levy, S. and Miller, R.V. Eds.) pp 347-375. McGraw-Hill Publishing Co., New York.

Roberts, M. C. 1989. Plasmids of *Neisseria gonorrhoeae* and other *Neisseria* species. Rev. Clin. Microbiol. 2:S18-S23.

Roberts, M. C. 1989. Plasmid-mediated Tet M in *Haemophilus ducreyi*. Antimicrob. Agents Chemother. 33:1611-1613.

Roberts, M. C. 1990. Characterization of the Tet M determinant in urogenital and respiratory bacteria. Antimicrob. Agents Chemother. 34:476-478.

Roberts, M. C. 1991. Tetracycline resistance in *Peptostreptococcus* species. Antimicrob. Agents Chemother. 35:1682-1684.

Roberts, M. C. 1994. Epidemiology of tetracycline resistance determinants. Trends Microbiol. 2:353-357.

Roberts, M. C. 1996. Tetracycline resistant determinants: mechanisms of action, regulation of expression, genetic mobility and distribution. FEMS Microbiol. Rev. 19:1-24.

Roberts, M. C. 1997. Genetic mobility and distribution of tetracycline resistance determinants. p. 206-218. In Antibiotic resistance: origins, evolution, selection and spread. Ciba Foundation symposium 207. John Wiley & Sons, Chichester, UK 1997.

- Roberts, M. C. 1997. Oral bacteria: Reservoirs for antibiotic resistance traits. APUA Newsletter. 15:1-6.
- Roberts, M. C. 2000. APUA-Aliiance for the prudent use of antibiotics. ASM News 66:108.
- Roberts, M. C., L. A. Actis, and J. H. Crosa. 1985. Molecular characterization of chloramphenicol resistant *Haemophilus parainfluenzae* and *Haemophilus ducreyi*. Antimicrob. Agents Chemother. 28:176-180.
- Roberts, M. C., W. Chung, and D. E. Roe. 1996. Characterization of tetracycline and erythromycin determinants in *Treponema denticola*. Antimicrob. Agents Chemother. 40:1690-1694.
- Roberts, M. C., W. Chung, D. E. Roe, M. Xia, C. Marquez, G. Borthagaray, W.L. Whittingotn, and K. K. Holmes. 1999. Erythromycin-resistant *Neisseria gonorrhoeae* and oral commensal *Neisseria* spp. carry known rRNA methylase genes. Antimicrob. Agents Chemother. 43:1367-1372.
- Roberts, M. C., and S. L. Hillier. 1990. Genetic basis of tetracycline resistance in urogenital bacteria. Antimicrob. Agents Chemother. 34:261-264.
- Roberts, M. C., S. L. Hillier, J. Hale, K. K. Holmes, and G. E. Kenny. 1986. Tetracycline resistance and *tetM* in pathogenic urogenital bacteria. Antimicrob. Agents Chemother. 30:810-812.
- Roberts, M. C., and G. E. Kenny. 1986. Dissemination of the *tetM* tetracycline resistance determinant to *Ureaplasma urealyticum*. Antimicrob. Agents Chemother. 29:350-352.
- Roberts, M. C., and G. E. Kenny. 1987. Conjugal transfer of transposon Tn916 from *Streptococcus faecalis* to *Mycoplasma hominis*. J. Bacteriol. 169:3836-3839.
- Roberts, M. C., and J. S. Knapp. 1988. Host range of the conjugative 25.2 Mdal tetracycline resistance plasmid from *Neisseria gonorrhoeae*. Antimicrob. Agents Chemother. 32:488-491.

- Roberts, M. C., and J. S. Knapp. 1989. Transfer frequency of various 25.2 Mdal TetM-containing plasmids in *Neisseria gonorrhoeae*. Sex. Trans. Dis. 16:91-94.?
- Roberts, M. C., and J. Lansciardi. 1990. Transferable Tet M in *Fusobacterium nucleatum*. Antimicrob. Agents Chemother. 34:1836-1838.
- Roberts, M. C., R. B. Leonard, A. M. Briselden, F. D. Schoenknecht, and M. B. Coyle. 1992. Characterization of antibiotic resistant *Corynebacterium striatum* strains. J. Antimicrob. Chemother. 30:463-474.
- Roberts, M. C., L. V. McFarland, P. Mullany, and M. E. Mulligan. 1994. Characterization of the genetic basis of antibiotic resistance in *Clostridium difficile*. J. Antimicrob. Chemother. 33:419-429.
- Roberts, M. C., B. J. Moncla, and S. L. Hillier. 1991. Characterization of unusual tetracycline resistant gram-positive bacteria. Antimicrob. Agents Chemother. 35:2655-2657.
- Roberts, M. C., Y. Pang, D. E. Riley, S. L. Hillier, R. Berger, and J. N. Krieger. 1993. Detection of Tet M and Tet O tetracycline resistance genes by polymerase chain reaction. Molec. Cell. Probes. 7:387-393.
- Roberts, M. C., Y. Pang, R. C. Spencer, T. G. Winstanley, B. A. Brown, and R. J. Wallace, Jr. 1991. Tetracycline resistance in *Moraxella (Branhamella) catarrhalis*-demonstration of two clonal outbreaks using pulsed-field gel electrophoresis. Antimicrob. Agents Chemother. 35:2453-2455.
- Roberts, M. C., and A. L. Smith. 1980. Molecular characterization of "plasmid-free" antibiotic resistant *Haemophilus influenzae*. J. Bacteriol. 144:476-479.
- Roe D. E., P. Braham, A. Weinberg and M. C. Roberts. 1995. Characterization of tetracycline resistance in *Actinobacillus actinomycetemcomitans*. Oral Microbiol. Immun. 10:227-232.
- Roe, D. E., A. Weinberg and M. C. Roberts. 1995. Characterization of erythromycin resistance in *Campylobacter (Wolinella) rectus*. Clin. Infect.

Dis. 20:S370-371.

- Rogalski, W. 1985. Chemical modification of the tetracyclines, p. 179-316. In J.J. Hlavka and J.H. Boothe (ed.), *Handbook of experimental pharmacology*, vol. 78. Springer-Verlag K.G., Berlin.
- Ross, J. I., E. A. Eady, J. H. Cove, and W. J. Cunliffe. 1998. 16S rRNA mutation associated with tetracycline resistance in a Gram-positive bacterium. *Antimicrob. Agents Chemother.* 42:1702-1705.
- Rouch, D. A., and R. A. Skurray. 1989. IS257 from *Staphylococcus aureus*: a member of an insertion sequence superfamily prevalent among Gram-positive and Gram-negative bacteria. *Gene* 76:195-205.
- Rubin, R. A., and S. B. Levy. 1991. Interdomain hybrid tet proteins confer tetracycline resistance only when they are derived from closely related members of the *tet* gene family. *J. Bacteriol.* 173:4503-4509.
- Sabath, L. D. 1969. Current concepts: drug resistance of bacteria. *New Engl. J. Med.* 280:91-94.
- Sakaguchi, R., and K. Shishido. 1988. Molecular cloning of a tetracycline-resistance determinant from *Bacillus subtilis* chromosomal DNA and its expression in *Escherichia coli* and *B. subtilis*. *Biochim. Biophys. Acta.* 949:9-57.
- Salyers, A. A., N. B. Shoemaker, and L-Y. Li. 1995. In the Driver's seat: the *Bacteroides* conjugative transposons and the elements they mobilize. *J. Bacteriol.* 177:5727-5731.
- Salyers, A. A., N. B. Shoemaker, A.M. Stevens, and L-Y. Li. 1995. Conjugative transposons: an unusual and diverse set of integrated gene transfer elements. *Microbiol Rev.* 59:579-590.
- Sanchez, L., W. Pan, M. Vinas, and H. Nikaido. 1997. The *acrAB* homology of *Haemophilus influenzae* codes for a functional multidrug efflux pump. *J. Bacteriol.* 179:6855-6857.
- Sanchez-Pescador, R., J. T. Brown, M. Roberts, and M. S. Urdea. 1988. Homology of the TetM with translational elongation factors: implications

for potential modes of tetM conferred tetracycline resistance. Nucl. Acid Res. 16:1218.

Sangare, L., R. Morisset, and M. Ravaoarinoro. 1999. In-vitro anti-chlamydial activities of free and liposomal tetracycline and doxycycline. J. Med. Microbiol. 48:689-693.

Seppala, H., T. Klaukka, J. Vuopio-Varkila, A. Muotiala, H. Helenius, K. Lager, and P. Huovinen. 1997. The effect of changes in the consumption of macrolide antibiotics on erythromycin resistance in group A streptococci in Finland. N. Engl. J. Med. 337:441-446.

Schnabel, E. L., and A. L. Jones. 1999. Distribution of tetracycline resistance genes and transposons among phylloplane bacteria in Michigan apple orchards. App. Environ. Microbiol. 65:4898-4907.

Schnappinger, D., and W. Hillen. 1996. Tetracyclines: antibiotic action, uptake, and resistance mechanisms. Arch. Microbiol. 165:359-369.

Schwarz, E. and G. Regev-Yochay. 1999. Primaquine as prophylaxis for malaria for nonimmune travelers: A comparison with mefloquine and doxycycline. Clin. Infect. Dis. 29:1502-1506.

Schwarz, S., M. Cardoso, and H. C. Wegener. 1992. Nucleotide sequence and phylogeny of *tet(L)* tetracycline resistance determinant encoded by plasmid pSTE1 from *Staphylococcus hyicus*. Antimicrob. Agents Chemother. 36:580-588.

Schwarz, S., M. C. Roberts, C. Werckenthin, Y. Pang, and C. Lange. 1998. Tetracycline resistance in *Staphylococcus* spp. from domestic and pet animals. Vet. Microbiol. 63:217-228.

Scott, K. P., C. M. Melville, T. M. Barbosa, and H. J. Flint. 2000. Occurrence of the new tetracycline resistance gene *tet(W)* in bacteria from the human gut. Antimicrob. Agents Chemother. 44:775-777.

Scott, J. R. 1992. Sex and the single circle: Conjugative transposition. J. Bacteriol. 174:6005-6010.

Sheridan, R. P., and I. Chopra. 1991. Origin of tetracycline efflux proteins: conclusions from nucleotide sequence analysis. Mol. Microbiol. 5:895-900.

- Shonekan, D., S. Handwerger, and D. Mildvan. 1997. Comparative in-vitro activities of RP59500 (quinupristin/dalfopristin), CL 329,998, CL 331,002, trovafloxacin, clinafloxacin, teicoplanin and vancomycin against Gram-positive bacteria. *J. Antimicrob. Chemother.* 39:405-409.
- Shaw, W. V., D. H. Bouanchaud, and F. W. Goldstein. 1978. Mechanism of transferable resistance to chloramphenicol in *Haemophilus parainfluenzae*. *Antimicrob. Agents Chemother.* 13:326-330.
- Showsh, S. A., and R. E. Andrews, Jr. 1992. Tetracycline enhances Tn916-mediated conjugal transfer. *Plasmid.* 28:213-224.
- Sloan, J., L. M. McMurry, D. Lyras, S. B. Levy, and J. I. Rood. 1994. The *Clostridium perfringens* Tet P determinant comprises two overlapping genes: *tetA(P)*, which mediates active tetracycline efflux, and *tetB(P)*, which is related to the ribosomal protection family of tetracycline-resistance determinants. *Mol. Microbiol.* 11:403-415.
- Smidt, H., D. Song, J. van der Oost and W. M. de Vos. 1999. Random transposition by Tn916 in *Desulfitobacterium dehalogenans* allows for isolation and characterization of halorespiration-deficient mutants. *J. Bacteriol.* 181:6882-6888.
- Smilack, J.D. 1999. The tetracyclines. *Mayo Clin. Proc.* 74: 727-729.
- Smith, H. W., and W. E. Crabb. 1976. The effect of the continuous administration of diets containing low levels of tetracyclines on the incidence of drug-resistant *Bacterium coli* in the faeces of pigs and chickens: the sensitivity of the *Bacterium coli* to other chemotherapeutic agents. *Vet. Rec.* 69:24-30.
- Somani, J., V. B. Bhullar, K. A. Workowski, C. E. Farshy, and C. M. Black. 2000. Multiple drug-resistant *Chlamydia trachomatis* associated with clinical treatment failure. *J. Infect. Dis.* 181:1420-1427.
- Someya, Y., A. Yamaguchi, and T. Sawai. 1995. A novel glycyclcycline, 9-(*N,N*-dimethylglycylamido)-6-demethyl-6-deoxytetracycline, is neither transported nor recognized by the transposon Tn10-encoded metal-tetracycline/H⁺ antiporter. *Antimicrob. Agents Chemother.* 39 : 247-249.

- Someya, Y., T. Kimura-Someya, and A. Yamaguchi. 2000. Role of the charge interaction between Arg(70) and Asp(120) in the Tn10-encoded metal-tetracycline/H⁺ antiporter of *Escherichia coli*. J. Biol. Chem 275:210-214.
- Sorum, H., M. C. Roberts, and J. H. Crosa. 1992. Identification and cloning of a tetracycline resistance gene from the fish pathogen *Vibrio salmonicida*. Antimicrob. Agents Chemother. 36:611-615.
- Speer, B. S., L. Bedzyk, and A. A. Salyers. 1991. Evidence that a novel tetracycline resistance gene found on two *Bacteroides* transposons encodes an NADP-requiring oxidoreductase. J. Bacteriol. 173:176-183.
- Spies, T., R. Laufs and F-C. Riess. 1983. Amplification of resistance genes in *Haemophilus influenzae* plasmids. J. Bacteriol. 155:839-846.
- Stasinopoulos, S. J., G. A. Farr, and D. H. Bechhofer. 1998. *Bacillus subtilis tetA(L)* gene expression: evidence for regulation by translational reinitiation. Molec. Microbiol. 30:923-932.
- Stockstad, E.L.R., T.H. Jukes, J. Pierce, A.C. Page, and A. L. Franklin . 1949. The multiple nature of the animal protein factor. J. Biol.Chem. 180:647-654.
- Su, Y. A., P. He, and D. B. Clewell. 1992. Characterization of the *tet(M)* determinant of Tn916: evidence for regulation by transcription attenuation. Antimicrob. Agents Chemother. 36:769-778.
- Sum, P-E., V. J. Lee, R. T. Testa, J. J. Hlavka, G. A. Ellestad, J. D. Bloom, Y. Gluzman and F. P. Tally. 1994. Glycylcyclines. 1. A new generation of potent antibacterial agents through modification of 9-aminotetracyclines. J. Med. Chem. 37:184-188.
- Sum, P. E., and P. Petersen. 1999. Synthesis and structure-activity relationship of novel glycylcycline derivatives leading to the discovery of GAR-936. Bioorg. Med. Chem. Lett. 9:1459-1462.
- Swann, M. M. 1969. Report of joint committee on the use of antibiotics in animal husbandry and veterinary medicine. Cmnd. 4190. Her Majesty's Stationery Office, London.

Takahashi, H., H. Watanabe, T. Kuroki, Y. Watanabe, and S. Yamai. 2002. Identification of *tet(B)*, encoding high-level tetracycline resistance, in *Neisseria meningitidis*. *Antimicrob. Agents Chemother.* 46:4045-4046.

Tamayo, M., R. Sa-Leao, I. S. Sanches, E. Castaneda, and H. de Lencastre. 1999. Dissemination of a chloramphenicol-and tetracycline-resistant but penicillin-susceptible invasive clone of serotype 5 *Streptococcus pneumoniae* in Colombia. *J. Clin. Micro.* 7:2337-2342.

Tannock, G. W., J. B. Luchansky, L. Miller, H. Connell, S. Thode-Andersen, A. A. Mercer, and T. R. Kaenhammer. 1994. Molecular characterization of a plasmid-borne (pGT633) erythromycin resistance determinant (*ermGT*) from *Lactobacillus reuteri* 100-63. *Plasmid* 31:60-71.

Tauch, A., S. Gotker, A. Puhler, J. Kalinowskim and G. Thierbach. 2002. The 27.8 –kb R-plasmid pTET3 from *Corynebacterium glutamicum* encodes the aminoglycoside adenyltransferase gene cassette *aadA9* and the regulated tetracycline efflux system Tet 33 flanked by active copies of the widespread insertion sequence IS6100. *Plasmid*. 48:117-129.

Tauch, A., A. Puhler, J. Kalinowski, and G. Thierbach. 2000. TetZ, a new tetracycline resistance determinant discovered in gram-positive bacteria, shows high homology to gram-negative regulated efflux systems. *Plasmid* 44:285-291.

Taylor, D. E., and A. Chau. 1996. Tetracycline resistance mediated by ribosomal protection. *Antimicrob. Agents Chemother.* 40:1-5.

Taylor, D. E, and P. Courvalin. 1988. Mechanisms of antibiotic resistance in *Campylobacter* species. *Antimicrob. Agents Chemother.* 32:1107-1112.

Taylor, D. E, C.A. Trieber, G. Trescher, and M. Bekkering. 1998. Host mutations (*miaA* and *rpsL*) reduce tetracycline resistance mediated by Tet(O) and Tet(M). *Antimicrob. Agents Chemother.* 42:59-64.

Testa, R. T., P. J. Petersen, N. L. Jacobus, P-E. Sum, V. J. Lee, and F. P. Tally. 1993. In vitro and in vivo antibacterial activities of the glycylcyclines, a new class of semisynthetic tetracyclines. *Antimicrob. Agents Chemother.* 37:2270-2277.

Threlfall, E. J., J. A. Frost, L. R. Ward, and B. Rowe. 1994. Epidemic in cattle and humans of *Salmonella typhimurium* DT104 with chromosomally integrated multiple drug resistance. Vet. Rec. 134:577.

Torres, O. R., R .Z. Korman, S. A. Zahler, and G. M. Dunny. 1991. The conjugative transposon Tn925: enhancement of conjugal transfer by tetracycline in *Enterococcus faecalis* and mobilization of chromosomal genes in *Bacillus subtilis* and *E. faecalis*. Mol. Gen. Genet. 225:395-400.

Triebel, C.A., N. Burkhardt, K.H. Nierhaus and D.E. Taylor. 1998. Ribosomal protection from tetracycline mediated by Tet(O): Tet(O) interaction with ribosomes is GTP-dependent. Biol. Chem. 379:847-855.

Tuckman, M., P.J. Petersen, and S. Projan. 1998. Mutations in the interdomain region of TetA(A) lead to glycyclcycline resistance in *Salmonella*. Abstr. C98, p97. In Program and abstracts of the 38th Interscience Conference on Antimicrobial Agents and Chemotherapy. American Society for Microbiology, Washington, D.C.

Tymiak, A. A., C. Aklonis, M. S. Bolgar, A. D. Kahle, D. R. Kirsch, J. O'Sullivan, M. A. Porubcan, P. Principe, W. H. Trejo, H. A. Ax, J. S. Wells, H. H. Andersen, P. V. Devasthale, H. Telikepalli, D. Vander Velde, J.-Y. Zou, and L. A. Mitscher. 1993. Novel tetracycline glycosides active against tetracycline-resistant bacteria. J. Org. Chem. 58:535-537

Urquhart, E., and M. Addy. 1995. Topical antimicrobials: new horizons for management of periodontal disease in general practice? Dental Update , April :104-111.

van den Bogert, C., and A. M. Kroon. 1981. Tissue distribution and effects on mitochondrial protein synthesis of tetracyclines after prolonged continuous intravenous administration to rats. Biochem. Pharmacol. 30:1706-1709.

van der Hulst, R . W. M., J. J. Keller, E. A. J. Rauws, and G. N. J. Tytgat. 1996. Treatment of *Helicobacter pylori* infection: a review of the world literature. Helicobacter 1:6-19.

- van Klingerden, B., J. D. A. van Embden, and M. Dessens-Kroon. 1977. Plasmid-mediated chloramphenicol resistance in *Haemophilus influenzae*. *Antimicrob. Agents Chemother.* 11:383-387.
- van Steenberghe, D., B. Rosling, P-O. Soder, R.G. Landry, U. van der Velden, M. F.T. Timmerman, E. F. McCarthy, G. Vandenhoven, C. Wouters, M. Wilson, J. Matthews, and H. N. Newman. 1999. A 15-month evaluation of the effects of repeated subgingival minocycline in chronic adult periodontitis. *J. Periodontol.* 70:657-667.
- Wang, Y., and D. E. Taylor. 1991. A DNA sequence upstream of the *tet(O)* gene is required for full expression of tetracycline resistance. *Antimicrob. Agents Chemother.* 35:2020-2025.
- Watanabe, T. 1963. Infectious heredity of multiple drug resistance in bacteria. *Bacteriol. Rev.* 27:87-115.
- Wasteson, Y., S. Hoie and M. C. Roberts. 1994. Characterization of antibiotic resistance in *Streptococcus suis*. *Vet. Microbiol.* 41:41-49.
- Weinstein, R.A. 1986. Endemic emergence of cephalosporin-resistant enterobacter: relation to prior therapy. *Infect. Cont.* 7:120-123.
- Weiss, W. J., N. V. Jacobus, P. J. Petersen, and R. T. Testa. 1995. Susceptibility of enterococci, methicillin-resistant *Staphylococcus aureus* and *Streptococcus pneumoniae* to the glycyclines. *J. Antimicrob. Chemother.* 36:225-230.
- Wexler H. M., E. Molitoris, and S. M. Finegold. 1994. In vitro activities of two new glycyclines, *N,N*-dimethylglycylamido derivatives of minocycline and 6-demethyl-6-deoxytetracycline, against 339 strains of anaerobic bacteria. *Antimicrob. Agents Chemother.* 38:2513-2515.
- Whittington, W. L., M. C. Roberts, J. Hale, and K. K. Holmes. 1995. Susceptibilities of *Neisseria gonorrhoeae* to the glycyclines. *Antimicrob. Agents Chemother.* 39:1864-1865.
- Williams, D. N. 1992 Tetracyclines, p.211-214. *In* S.L. Gorbach, J.G. Bartlett and N.R. Blacklow (ed.), *Infectious Diseases*. W.B. Saunders Co., Philadelphia.

- Winterscheid, K. K., W. L. Whittington, M. C. Roberts, J. R. Schwebke, and K. K. Holmes. 1994. Decreased susceptibility to penicillin G and Tet M plasmids in genital and anorectal isolates of *Neisseria meningitidis*. *Antimicrob. Agents Chemother.* 38:1661-1663.
- Wise, R., and J. M. Andrews. 1994. In vitro activities of two glycylcyclines. *Antimicrob. Agents Chemother.* 38:1096-1102.
- Witte, W. 1998. Medical consequences of antibiotic use in agriculture. *Science* 279:996-997.
- Xia, M., Y. Pang, and M. C. Roberts. 1995. Detection of two groups of 25.2 Mda Tet M plasmids by polymerase chain reaction of the downstream region. *Molec. Cell. Probes* 9:327-332, 1995.
- Yamaguchi, A., N. Ono, T. Akasaka, T. Noumi, and T. Sawai. 1990. Metal-tetracycline/H⁺ antiporter of *Escherichia coli* encoded by a transposon, Tn10. *J. Biol. Chem.* 265:15525-15530.
- Zhao, J., and T. Aoki. 1992. Nucleotide sequence analysis of the Class G tetracycline resistance determinant from *Vibrio anguillarum*. *Microbiol. Immunol.* 36:1051-1060.