



Bibliography

Bibliography

Bibliography

Bibliography:

Aggarwal R, Caffrey P, Leadlay PF, Smith CJ, Staunton J.: The thioesterase of the erythromycin-producing polyketide synthase: mechanistic studies *in vitro* to investigate its mode of action and substrate specificity. 1995, *J Chem Soc Chem Commun.* 15, 1519.

Alvarez MA, Fu H, Khosla C, Hopwood DA, Bailey J.: Engineered biosynthesis of novel polyketides: properties of the whiE aromatase/cyclase. 1996, *Nature Biotechnol* 14(3):335.

B.Shen, 2000, Topics in Current Chemistry, vol. 209.

Baerga-Ortiz, A.: Directed mutagenesis alters the stereochemistry of catalysis by isolated ketoreductase domains from the erythromycin polyketide synthase. 2006, *Chem. Biol.* 13, 277–285.

Baltz RH, McHenney MA, Cantwell CA, Queener SW, Solenberg PJ.: Applications of transposition mutagenesis in antibiotic producing *Streptomyces*. 1997, *Antonie vanLeeuwenhock* 71(1-2):179.

Bao W, Wendt-Pienkowski E, Hutchinson CR.: Reconstitution of the iterative type II polyketide synthase for tetracenomycin F2 biosynthesis, 1998, *Biochemistry* 37(22):8132.

Bartel, P. L.; Zhu, C. B.; Lampel, J. S.; Dosch, D. C.; Connors, N. C.; Strohl, W. R.; Beale, J. M.; Floss, H. G.: Biosynthesis of anthraquinones by interspecies cloning of actinorhodin biosynthesis genes in streptomycetes: clarification of actinorhodin gene functions. 1990, *J. Bacteriol.*, 172(9), 4816.

Benetley R, Bennet JW.: Constructing Polyketides : from Collie to Combinatorial Biosynthesis, 1999, *Ann. Rev. Microbiol.* 53; 411-46.

Bibliography

Benteley, S. D., Broen S., Murphy LD., Harris DE , Quail MA , Parkhill J, Barrell BG, Mc Cormick JR, Santamaria RI, Losick R.,SCP2, a 356,023 bp linear plasmid adapted to the ecology and developmental biology of its host, *S. Coelicolor* A3(2). 2002, *Mol. Microbiology*, 5: 1615 – 1628.

Benteley, S. D., Chater, K.F., Cerdarro – Taranga AM, Challis GL,, Thomoson NR, Harris DE , Quail MA, Keiser H, Harper D., Complete genome sequence of the model actinomycetes *Streptomyces coelicolor* A3(2). 2002, *Nature* 417: 141-147.

Bentley R.: Biochemistry of fungi. 1962, *Annu. Rev. Biochem.* . 31:589–624.

Bentley R.: John Norman Collie: chemist and mountaineer. 1999, *J. Chem. Educ.* 76:41–47.

Bevitt, D. J.; Cortes, J.; Haydock, S. F.; Leadlay, P. F.: 6-Deoxyerythronolide-B synthase 2 from *Saccharopolyspora erythraea*. Cloning of the structural gene, sequence analysis and inferred domain structure of the multifunctional enzyme.1992, *Eur. J.Biochem.*, 204(1), 39.

Bibb, M. J.; Schottel, J. L.; Cohen, S. N.: A DNA cloning system for interspecies gene transfer in antibiotic-producing *Streptomyces*. 1980, *Nature* 284, 526.

Bierman, M., Choi, S. U., Lee, C. K., Hwang, Y. I., Kinoshita, H., and Nihira, T., Plasmid cloning vectors for conjugal transfer from *Escherichia coli* to *Streptomyces* ssp.. 1992, *Gene*, 116:43–49.

Birch AJ. : *To See the Obvious*. Washington, DC: 1995, *Am. Chem. Soc.*

Bisang, C.; Long, P. F.; Corte's, J.; Westcott, J.; Crosby, J.; Matharu, A.-L.; Cox, R. J.; Simpson, T. J.; Staunton, J.; Leadlay, P. F.: A chain initiation factor common to both modular and aromatic polyketide synthases 1999, *Nature* 401 (6752):, 502.

Bibliography

Boom TV, Cronan JE.: Genetics and regulation of bacterial lipid metabolism. **1989**, *Ann Rev Microbiol*, 43:317.

Brady, S. & Clardy, J.: J. Long-chain N-acyl amino acid antibiotics isolated from heterologously expressed environmental DNA. **2000**, *J. Am. Chem. Soc.* **122**, 12903–12904.

Brown DW, Adams TH, Keller NP.: Aspergillus has distinct fatty acid synthases for primary and secondary metabolism. **1996**, *Proc Natl Acad Sci USA* **93**(25):14,873.

Butler, M. J.; Friend, E. J.; Hunter, I. S.; Kaczmarek, F. S.; Sugden, D. A.; Warren, M.: Molecular cloning of resistance genes and architecture of a linked gene cluster involved in biosynthesis of oxytetracycline by *Streptomyces rimosus*. **1989**, *Mol. Gen. Genet.* **215**(2), 231.

C Méndez JA Salas.: Altering the glycosylation pattern of bioactive compounds **2001**, *Trends in Biotechnology*, Volume 19, Issue 11, 1145.

C. M. Kao, L. Katz...Ebert-Khosla, D. A. Hopwood, C. Khosla.: Harnessing the Biosynthetic Code: Combinations, Permutations, and Mutations. **1993**, *J. Am. Chem. Soc.* **115**, 11671-5.

C. Richard Hutchinson and Isao Fujii: POLYKETIDE SYNTHASE GENE MANIPULATION: A Structure-Function Approach in Engineering Novel Antibiotics. **1995**, *Ann., Rev. of Microbiol.* **49**:201-38.

Campelo AB, Gil JA: The candididin gene cluster from *Streptomyces griseus* IMRU 3570. **2002**, *Microbiology* **148**:51-59.

Cane DE.. Introduction: polyketide and nonribosomal polypeptide biosynthesis. From Collie to *Coli*. **1997**, *Chem. Rev.* **97**:2463–64.

Bibliography

Carreras CW, and Khosla C.: Purification and in vitro reconstitution of the essential protein components of an aromatic polyketide synthase **1998**, *Biochemistry* 37(8) :2084.

Cerdeño AM, Bibb MJ, Challis GL: Analysis of the prodiginine biosynthesis gene cluster of *Streptomyces coelicolor* A3(2): new mechanisms for chain initiation and termination in modular multi-enzymes. **2001**, *Chem Biol.*, 8:817-829.

Chakrabarti S, Bhattacharya D, Dasgupta D., Structural basis of DNA recognition by anticancer antibiotics, chromomycin A(3), and mithramycin: roles of minor groove width and ligand flexibility. **2000-2001**; *Biopolymers*, 56(2):85-95

Chakrabarty R, Bibb MJ: the ppGpp synthetase gene (relA) of *Streptomyces coelicolor* A3(2) plays a conditional role in antibiotic production and morphological differentiation. **1997**, *J. of Bacteriology*, 179: 5854- 5861.

Chater K., David Hopwood and the emergence of *Streptomyces* genetics. : **1999**, *Int Microbiol.*; 2(2):61-8.

Chater KF, horinouchi S., Signalling early development events in two highly diverged *Streptomyces* species. **2003**, *Molecular microbiology* 48: 9-15.

Chater, K. F.; Bruton, C. J.: Resistance, regulatory and production genes for the antibiotic methylenomycin are clustered. **1985**, *EMBO J.* 4(7), 1893.

Clardy Jon, Fischbach, M, A. & Walsh C. T.: New antibiotics , **2006**, bacterial natural products, 24, 1330-1341.

Collie JN.: Derivatives of the multiple keten group. **1907**, *J. Chem. Soc.* 91:1806–13.

Corte's, J.; Haydock, S. F.; Roberts, G. A.; Bevitt, D. J.; Leadlay, P. F. An unusually large multifunctional polypeptide in the erythromycin-producing polyketide synthase of *Saccharopolyspora erythraea*. **1990**, *Nature* 348 (6297);: 176.

Bibliography

Cortes J, Wiesmann KEH, Roberts GA, Brown MJB, Staunton J, Leadlay PF. : Repositioning of a domain in a modular polyketide synthase to promote specific chain cleavage. **1995**, *Science*, 268(5216):1487.

Cortes, J.; Wiesmann, K. E. H.; Roberts, G. A.; Brown, M. J. B.; Staunton, J.; Leadlay, P. F.: Repositioning of a domain in a modular polyketide synthase to promote specific chain cleavage. **1995**, *Science* 268 (5216), 1487.

Diarmuid Hughes; Exploiting Genomics. Genetics and Chemistry to combat Antibiotic Resistance, **2003**, *Nature Rev. Genet.* 432; Volume 4.

Dickens ML, Ye J, Strohl WR.: Analysis of clustered genes encoding both early and late steps in daunomycin biosynthesis by *Streptomyces* sp. strain C5. **1995**, *J Bacteriol.*, 177(3):536.

Donadio, S.; Staver, M. J.; McAlpine, J. B.; Swanson, S. J.; Katz, L.: Modular organization of genes required for complex polyketide biosynthesis., **1991**, *Science*, 25(5006), 675.

Ehmann B, Schafer E.: Nucleotide sequences encoding two different chalcone synthases expressed in cotyledons of SAN 9789 treated mustard (*Sinapis alba* L.) **1988**, *Plant Mol Biol* 11:869.

Elliot MA, Talbott NJ: building filaments in the air: aerial morphogenesis in bacteria and fungi, **2004**, *curr. Opinion micobiol.*, 7 :594-601.

Eugenio P. Patallo, Gloria Blanco, Carsten Fischer, Alfredo F. Brana, Jürgen Rohr, Carmen Méndez, and José A. Salas.: Deoxysugar Methylation during Biosynthesis of the Antitumor Polyketide Elloramycin by *Streptomyces olivaceus* CHARACTERIZATION OF THREE METHYLTRANSFERASE GENES*. **2001**, *The Journal of Biological Chemistry* Vol. 276, No. 22, Issue of June 1, pp. 18765–18774.

Bibliography

Evelyn Wendt-Pienkowski, Yong Huang, Jian Zhang, Bensheng Li, Hao Jiang, Hyungjin Kwon, C. Richard Hutchinson, and Ben Shen : Cloning, Sequencing, Analysis, and Heterologous Expression of the Fredericamycin Biosynthetic Gene Cluster from *Streptomyces griseus*. **2005**, *J. Am. Chem. Soc.*, **127** (47), 16442 - 16452.

Fernandez-Moreno MA, Martinez E, Boto L, Hopwood DA, Malpartida F.: Gerbera hybrida (Asteraceae) imposes regulation at several anatomical levels during inflorescence development on the gene for dihydroflavonol-4-reductase. **1992**, *J BiolChem.*, **267**:19,278.

Fu H, Hopwood DA, Khosla C.: Engineered biosynthesis of novel polyketides: evidence for temporal, but not regiospecific, control of cyclization of an aromatic polyketide precursor. **1994**, *Chem Biol.*, **1**(4):205.

Fu, H.; Ebert-Khosla, S.; Hopwood, D. A.; Khosla, C.: Engineered biosynthesis of novel polyketides: dissection of the catalytic specificity of the act ketoreductase. : **1994**, *J. Am.Chem. Soc.* **116**, 4166.

Fu, H.; Ebert-Khosla, S.; Hopwood, D. A.; Khosla, C.: Engineered biosynthesis of novel polyketides: stereochemical course of two reactions catalyzed by a polyketide synthase. **1994**, *Biochemistr*, **33**(31), 9321.

Fujii I, Ono Y, Tada H,Gomi K, Ebizuka Y, Sankawa U.: Cloning of the polyketide synthase gene atX from *Aspergillus terreus* and its identification as the 6-methylsalicylic acid synthase gene by heterologous expression. **1996**, *Mol Gen Genet* **253**:1.

Gaisser, S.; Bohm, G. A.; Corte's, J.; Leadlay, P. F.: Analysis of seven genes from the eryAI-eryK region of the erythromycin biosynthetic gene cluster in *Saccharopolyspora erythraea*. **1997**, *Mol. Gen.Genet.*, **256**(3), 239.

Bibliography

- Gaisser, S.; Bohm, G. A.; Doumith, M.; Raynal, M. C.; Dhillon, N.; Cortes, J.; Leadlay, P. F.**: Analysis of eryBI, eryBIII and eryBVII from the erythromycin biosynthetic gene cluster in *Saccharopolyspora erythraea*. 1998, *Mol. Gen. Genet.*, 258(1-2), 78.
- Garg RP, Ma Y, Hoyt JC, Parry RJ**: Molecular characterization and analysis of the biosynthetic gene cluster for the azoxy antibiotic valanimycin. 2002 Oct; *Mol Microbiol*. 46(2):505-17.
- Garwin, J. L.; Klages, A. L.; Cronan, J. E., Jr.**: Structural, enzymatic, and genetic studies of beta-ketoacyl-acyl carrier protein synthases I and II of *Escherichia coli*. 1980, *J. Biol. Chem.* 255(24), 11949.
- Griffin, D. A.; Leeper, F. J.; Staunton, J.**: Biomimetic syntheses of polyketide aromatics from pyrylium salts. 1984, *J. Chem. Soc., PerkinTrans. 1*, 1035.
- Grimm A, Madduri K, Ali A, Hutchinson CR.**: Characterization of the *Streptomyces peucetius* ATCC 29050 genes encoding doxorubicin polyketide synthase. 1994, *Gene*:151(1-2): 1-10.
- He XM, Liu HW.**: Formation of unusual sugars: Mechanistic studies and biosynthetic applications. 2002, *Ann Rev Biochem* 71: 701-754.
- Helariutta Y, Kotilainen M, Elomaa P, Teeri TH, Albert VA.**: Gerbera hybrida (Asteraceae) imposes regulation at several anatomical levels during inflorescence development on the gene for dihydroflavonol-4-reductase, 1995, *Plant Mol Biol* 28(5):935.
- Hesketh A, Sun J, Bibb MJ**: Induction of ppGpp synthesis in *Streptomyces coelicolor* A3(2) grown under conditions of nutritional sufficiency elicits actII-ORF4 transcription and actinorhodin biosynthesis. 2001, *Mol Microbial* 39:136-144.

Bibliography

Hiramatsu K, Hanaki H, Ino T, Yabuta K, Oguri T, Tenover FC., Methicilin resistant *S.aureus*, clinical strain with reduced Vancomycine susceptibility. 1997, *J. of Anti. Chemo.* 40, 135-136.

Hopwood DA .: Genetic engineering of *Streptomyces* to create hybrid antibiotics 1993, *Curr Opinion Biotechnol* 4(5):531-7.

Hopwood DA, Sherman DH.: Molecular genetics of polyketides and its comparison to fatty acid biosynthesis. 1990, *Ann Rev Genet* 24:37-66.

Hopwood DA.: Genetic Contributions to Understanding Polyketide Synthases, 1997 *Chem Rev* 97(7) :2465.

Hopwood, D. A.: 1986, In *Biological, Biochemical and Biomedical Aspects of Actinomycetes;* Szabo, G., Biro', S., Goodfellow, M.,Eds.; Akadémiai Kiadó: Budapest,; pp 3-14.

Hopwood, D. A.: Genetic engineering of *Streptomyces* to create hybrid antibiotics. 1993, *Curr. Opin. Biotechnol.* 4(5), 531.

Hopwood, D. A.; Bibb, M. J.; Bruton, C. J.; Chater, K. F.; Feitelson, J. S.; Gil, J. A.: Cloning Streptomyces genes for antibiotic production. 1983, *Trends Biotechnol.*, 1(2), 42.

Hopwood D. A., Bibb, M. J., Chater, K. F., Keiser, T., Burton, C. J., Keiser H. M., Lydiate D. J. U., Smith ,C.P., Ward, J.M. and Shremph, H.: 1985, Genetic manipulation of *Streptomyces-* A laboratory manual. Norwich: The John Innes foundation

Hu, Z.; Bao, K.; Zhou, X.; Zhou, Q.; Hopwood, D. A.; Kieser, T.; Deng, Z.: Repeated polyketide synthase modules involved in the biosynthesis of a heptaene macrolide by *Streptomyces* sp. FR-008. 1994, *Mol. Microbiol.* 14(1), 163.

Bibliography

Hutchinson CR.: Prospects for the discovery of new (hybrid) antibiotics by genetic engineering of antibiotic-producing bacteria. **1988**, *Med Res Rev* 8:557.

Hutchinson. C. R., Isao Fujii.: Polyketide Synthase gene manipulation: a structure-function approach in engineering novel antibiotics. **1995**, *Annu. Rev. Microbiol.*.. 49: 201-38.

Ichinose K, Ozawa M, Itou K, Kunieda K, Ebizuka Y: Cloning, sequencing and heterologous expression of the medermycin biosynthetic gene cluster of *Streptomyces* sp. AM-7161: towards comparative analysis of the benzoisochromanequinone gene clusters. **2003**, *Microbiology*, 149:1633-1645.

Ikeda H, Ishikawa J, HanamotoA, Shinose M, Kikuchi H, shiba T, Sakaki Y, Hattori M, Omura S: complete genome sequence and comparative analysis of the industrial microorganism *Streptomyces avermitilis* . **2003**, *Nat. Biotechnology* 21: 526- 531.

J Rix U, Fischer C, Remsing LL, Rohr.: Modification of post-PKS tailoring steps through combinatorial biosynthesis. **2002**, *Nat Prod Rep* 19: 542-580.

Kao, C. M.; Katz, L.; Khosla, C.: Engineered biosynthesis of a complete macrolactone in a heterologous host. **1994**, *Science* 265(5171), 509.

Kao, C. M.; Luo, G.; Katz, L.; Cane, D. E.; Khosla, C.: Engineered Biosynthesis of Structurally Diverse Tetraketides by a Trimodular Polyketide Synthase. **1996**, *J. Am.Chem. Soc.* 118 (38), 9184.

Kao, C. M.; Luo, G.; Katz, L.; Cane, D. E.; Khosla, C.: Engineered Biosynthesis of a Triketide Lactone from an Incomplete Modular Polyketide Synthase. **1994**, *J. Am.Chem. Soc.* 116, 11612.

Kato JY, Miyahisa I, Mashiko M, Ohnishi Y, Horinouchi S: A single target is sufficient to account for the biological effects of the A-factor receptor protein of *Streptomyces griseus*. **2004**, *J Bacteriol* 186:2206-2211.

Bibliography

Katz L, Donadio S: Polyketide synthesis: prospects for hybrid antibiotics, 1993, *Ann Rev Microbiol* 47:875.

Kholkhov, A.S., Tovarova, I, I., Brisova, L. N., Pline, S.A., Schevechenko, L.A., Kornitskaya, E.Y., Ivkina, N.S., and Rapoport, I. A., A factor responsible for the biosynthesis of streptomycin by a mutant strain of *actinomycetes streptomycini*. 1967, Dokl. Akad. Nauk SSSR, 177, 232-235.

Khosla C, Ebert-Khosla S, Hopwood DA.: Targeted gene replacements in a Streptomyces polyketide synthase gene cluster: role for the acyl carrier protein. 1992, *Mol Microbiol*. 6(21):3237.

Khosla C, McDaniel R, Ebert-Khosla S, Torres R, Sherman DH, Bibb MJ, Hopwood DA.: Genetic construction and functional analysis of hybrid polyketide synthases containing heterologous acyl carrier proteins. 1993, *J Bacteriol* 175(8):2197

Khosla C, Zawada RJX.: Generation of polyketide libraries via combinatorial biosynthesis. 1996, *TIBTECH*, 14(9):335.

Khosla, C.: Engineered biosynthesis of novel polyketides. 1993, *Science* 262(5139), 1546-1557.

Kramer, P. J.; Zawada, R. J. X.; McDaniel, R.; Hutchinson, C.R.; Hopwood, D. A.; Khosla, C.: Rational design and engineered biosynthesis of a novel 19 carbon aromatic polyketide. 1997, *J. Am. Chem. Soc.* 119, 635.

L. M. Quiros, I. Aguirrezabalaga, C. Olano, C. Mendez, J. A. Salas.: Two glycosyltransferases and a glycosidase are involved in oleandomycin modification during its biosynthesis by *Streptomyces antibioticus*. 1998, *Molec. Microbiol*, 28, 1177.

Bibliography

Lal R, Khanna R, Kaur H, Khanna M, Dhingra N, Lal S, Gartemann KH, Eichenlaub R, Ghosh PK.: Engineering antibiotic producers to overcome the limitations of classical strain improvement programs. 1996, *Crit Rev Microbiol* 22(4):201.

Leadlay, P. F.; Staunton, J. Personal communication. (a)McDaniel, R.; Kao, M. C.; Fu, H.; Hevezi, P.; Gustafsson, K.;Betlach, M.; Ashley, G.; Cane, D. E.; Khosla, C. *J. Am. Chem.Soc.* 1997, 119, 4309.

Lombo F, Brana AF, Mendez C, Salas JA: The mithramycin gene cluster of *Streptomyces argillaceus* contains a positive regulatory gene and two repeated DNA sequences that are located at both ends of the cluster. 1999, *J Bacteriol* 181:642-647.

Lomovskaya N, Doi-Katayama Y, Filippini S, Nastro C, Fonstein L, Colombo AL, Hutchinson CR.: The *Streptomyces peucetius* *dpsY* and *dnrX* genes govern early and late steps of daunorubicin and doxorubicin biosynthesis. 1998, *J Bacteriol* 180(9):2379.

M. José Fernández Lozano, Lily L. Remsing, Luis M. Quirós, Alfredo F. Braña, Ernestina Fernández, César Sánchez, Carmen Méndez, Jürgen Rohr, and José A. Salas,J.: Characterization of Two Polyketide Methyltransferases Involved in the Biosynthesis of the Antitumor Drug Mithramycin by *Streptomyces argillaceus*. 2000, *Biol Chem*, Vol. 275, Issue 5, 3065-3074.

Magnuson K, Jackowski S, Rock CO, Cronan JE.: Regulation of fatty acid biosynthesis in *Escherichia coli*. 1993, *Microbiol Rev* 57(3):522.

Mahanti N, Bhatnagar D, Cary JW, Joubran J, Linz JE.: Structure and function of *fas-1A*, a gene encoding a putative fatty acid synthetase directly involved in aflatoxin biosynthesis in *Aspergillus parasiticus*. 1996, *Appl Environ Microbiol* 62(1):191.

Bibliography

Malpartida, F.; Hallam, S. E.; Kieser, H. M.; Motamedi, H.; Hutchinson, C. R.; Butler, M. J.; Sugden, D. A.; Warren, M.; McKillop, C.; Bailey, C. R.; Humphreys, G. O.; Hopwood, D. A.: Homology between *Streptomyces* genes coding for synthesis of different polyketides used to clone antibiotic biosynthetic genes. **1987**, *Nature* 325(6107), 818.

Malpartida, F.; Hallam, S.E.; Kieser, H.M.; Motamedi, H.; Hutchinson, C.R.; Butler, M.J.; Sugden, D.A.; Warren, M.; McKillop, C.; Bailey, C.R.; Humphreys, G.O.; Hopwood, D.A.: Homology between *Streptomyces* genes coding for synthesis of different polyketides used to clone antibiotic biosynthetic genes. **1987**, *Nature*, 325(6107), 818.

Malpartida, F.; Hopwood, D. A.: Molecular cloning of the whole biosynthetic pathway of a *Streptomyces* antibiotic and its expression in a heterologous host **1984**, *Nature* 309(5967), 462.

Malpartida, F.; Hopwood, D. A.: Physical and genetic characterization of the gene cluster for the antibiotic actinorhodin in *Streptomyces coelicolor* A3(2). **1986**, *Mol. Gen. Genet.* 205(1), 66.

Marsden, A. F. A.; Caffrey, P.; Aparicio, J. F.; Loughran, M. S.; Staunton, J.; Leadlay, P. F.: Stereospecific acyl transfers on the erythromycin-producing polyketide synthase. **1994**, *Science* 263 (5145), 378.

Matharu A-L, Cox RJ, Crosby J, Byrom KJ, Simpson TJ.: MCAT is not required for in vitro polyketide synthesis in a minimal actinorhodin polyketide synthase from *Streptomyces coelicolor*. **1998**, *Chem Biol* 5 (12) :699.

McAlpine, J.B.: Microbial genomics as a guide to drug discovery and structural elucidation: ECO-02301, a novel antifungal agent, as an example. **2005**, *J. Nat. Prod.* 68, 493–496.

Bibliography

McDaniel R, Ebert-Khosla S, Fu H, Hopwood DA, Khosla C.: Engineered biosynthesis of novel polyketides: influence of a downstream enzyme on the catalytic specificity of a minimal aromatic polyketide synthase. **1994**, *Proc. Natl. Acad. Sci. U.S.A.*, 91(24), 11542-6.

McDaniel R, Ebert-Khosla S, Fu H, Hopwood DA, Khosla C.: Engineered biosynthesis of novel polyketides: influence of a downstream enzyme on the catalytic specificity of a minimal aromatic polyketide synthase. **1994**, *Proc Natl Acad Sci USA.* Nov 22;91(24):11542-6.

McDaniel R, Ebert-Khosla S, Hopwood DA, Khosla C.: Rational design of aromatic polyketide natural products by recombinant assembly of enzymatic subunits **1995**, *Nature*, 375(6532), 549-54.

McDaniel R, Ebert-Khosla S, Hopwood DA, Khosla C.: Engineered Biosynthesis of Novel Polyketides: actVII and actIV Genes Encode Aromatase and Cyclase Enzymes, Respectively. **1994**, *J Am Chem Soc* 116(24):10855.

McDaniel R, Ebert-Khosla S, Hopwood DA, Khosla C.: Rational design of aromatic polyketide natural products by recombinant assembly of enzymatic subunits. **1995**, *Nature* 375:549.

McDaniel R.: Genetic approaches to Polyketide Antibiotics. **2005**, *Chemical Reviews*, Vol. 105, No. 2, 543- 557.

McDaniel, R.; Ebert-Khosla, S.; Hopwood, D. A.; Khosla, C.: Engineered biosynthesis of novel polyketides: actVII and activeIV genes encodes aromatase and cycalse enzymes respectively.: **1994**, *J.Am. Chem. Soc.* 116, 10855.

McDaniel, R.; Ebert-Khosla, S.; Hopwood, D. A.; Khosla, C.: Engineered biosynthesis of novel polyketides: manipulation and analysis of an aromatic polyketide synthase with unproven catalytic specificities. **1993**, *J.Am. Chem. Soc.* 115, 11671.

Bibliography

McDaniel, R.; Ebert-Khosla, S.; Hopwood, D.A.; Khosla, C.: Engineered biosynthesis of novel polyketides. 1993, *Science*, 262(5139):1546-50.

McDaniel, R.: Genetic approaches to Polyketide antibiotics, 2005, *Chemical reviews*, , Vol. 105, no 2, 543-557.

McDowall, K.J.; Doyle, D.; Butler, M.J.; Binnie, C.; Warren, M.; Hunter, I.S.: Characterization of an oxytetracycline-resistance gene, *otrA*, of *Streptomyces rimosus*. 1991, *Mol Microbiol.*;5(12):2923-33.

Menéndez N, Nur-e-Alam M, Fischer C, Braña AF, Salas JA, Rohr J, Méndez C.: Deoxysugar transfer during chromomycin A3 biosynthesis in *Streptomyces griseus* subsp. *griseus*: new derivatives with antitumor activity. 2006, *Appl Environ Microbiol.* 72(1):167-77.

Metsä-Ketelä, M.; Salo, V.; Halo, L.; Hautala, A.; Hakala, J.; Mäntsälä, P.; Ylihonko, K.: An efficient approach for screening minimal PKS genes from *Streptomyces*. 1999, *FEMS Microbiol. Lett.* 180(1), 1.

Mikko Metsä-Ketela", Laura Halo, Eveliina Munukka, Juha Hakala, Pekka Mäntsälä,1 and Kristiina Ylihonko.: Molecular Evolution of Aromatic Polyketides and Comparative Sequence Analysis of Polyketide Ketosynthase and 16S Ribosomal DNA Genes from Various *Streptomyces* Species. 2002. *Appl. and env. Microbiol.* Vol. 68, No. 9, 4472.

Monaghan RL, Tkacz JS.: Bioactive microbial products: focus upon mechanism of action. 1990, *Annu Rev Microbiol* 44:271.

Moore, B.S.; Hopke, J.N.: Discovery of a new bacterial polyketide biosynthetic pathway. 2001, *Chem. Biol. Chem.*, 2, 35.

Bibliography

Motamedi, H.; Hutchinson, C. R.: Cloning and heterologous expression of a gene cluster for the biosynthesis of tetracenomycin C, the anthracycline antitumor antibiotic of *Streptomyces glaucescens*. **1987**, *Proc. Natl. Acad. Sci. U.S.A.* **84**(13), 4445.

Muth, G., Nussbaumer, B., Wohlleben, W., and Puhler, A., (1989). A vector system with temperature- sensitive replicon for gene disruption and mutational cloning in *Streptomyces*. *Mol. Gen. Genet.*, **219**:341-348.

Natsume R, Ohnishi Y, Senda T, Horinouchi S: Crystal structure of a g-butyrolactone autoregulator receptor protein in *Streptomyces coelicolor* A3(2). **2004**, *J Mol Biol* **336**:409-419.

Nunez LE, Mendez C, Brana AF, Blanco G, Salas JA: The biosynthetic gene cluster for the beta-lactam carbapenem thienamycin in *Streptomyces cattleya*. **2003**, *Chem Biol* **10**:301-311.

O'Hagan D.: 1991, The polyketide metabolites. Ellis Horwood, Chichester,UK

O'Hagan D.: Biosynthesis of fatty acid and polyketide metabolites (1992) *Nat Prod Rep* **9**:447; (b) **O'Hagan D (1993)** *Nat Prod Rep* **10**:593; (c) **O'Hagan D.:(1995)**, *Nat Prod Rep* **12**:1.

O'Hare, H.M., Baerga-Ortiz, A., Popovic, B., Spencer, J.B. & Leadlay, P.F.: High-throughput mutagenesis to evaluate models of stereochemical control in ketoreductase domains from the erythromycin polyketide synthase. **2006**, *Chem. Biol.* **13**, 287–296.

Oliynyk M, Stark CB, Bhatt A, Jones MA, Hughes-Thomas ZA, Wilkinson C, Oliynyk Z, Demydchuk Y, Staunton J, Leadlay PF: Analysis of the biosynthetic gene cluster for the polyether antibiotic monensin in *Streptomyces cinnamonensis* and evidence for the role of monB and monC genes in oxidative cyclization. **2003**, *Mol Microbiol* **49**:1179-1190.

Bibliography

Oliynyk, M.; Brown, M. J. B.; Corte's, J.; Staunton, J.; Leadlay, P. F.: A hybrid modular polyketide synthase obtained by domain swapping. **1996**, *Chem. Biol.* 3(10), 833.

Pageni BB, Oh TJ, Liou K, Yoon YJ, Sohng JK : Genetically engineered biosynthesis of macrolide derivatives including 4-amino- 4,6-dideoxy-L-glucose from *Streptomyces venezuelae* YJ003-OTBP3. **2008**, *J Microbiol Biotechnol*. 18(1):88-94.

Pang X, Aigle B, Girardet JM, Mangenot S, Pernodet JL, Decaris B, Leblond P: Functional angucycline-like antibiotic gene cluster in the terminal inverted repeats of the *Streptomyces ambofaciens* linear chromosome. **2004**, *Antimicrob Agents Chemother* 48:575-588.

Pieper, R.; Luo, G.; Cane, D. E.; Khosla, C.: Remarkably Broad Substrate Specificity of a Modular Polyketide Synthase in a Cell-Free System. **1995**, *J. Am. Chem. Soc.* 117, 11373.

Rajgarhia VB, Strohl WR.: Minimal *Streptomyces* sp. strain C5 daunorubicin polyketide biosynthesis genes required for aklanonic acid biosynthesis. **1997**, *J Bacteriol*, 179(8):2690.

Rascher A, Hu Z, Viswanathan N, Schirmer A, Reid R, Nierman WC, Lewis M, Hutchinson CR: Cloning and characterization of a gene cluster for geldanamycin production in *Streptomyces hygroscopicus* NRRL 3602. **2003**, *FEMS Microbiol Lett* 218:223-230.

Rawlings BJ.: Biosynthesis of polyketides. **1997**, *Nat Prod Rep* 14:335; (b) **Rawlings BJ.**: **1997**, *Nat Prod Rep* 14:523; (c) **Rawlings BJ.**: **1998**, *Nat Prod Rep* 15:275.

Recio E, Colinas A, Rumbero A, Aparicio JF, Martin JF: PI factor, a novel type quorum-sensing inducer elicits pimaricin production in *Streptomyces natalensis* **2004**, *J Biol Chem* 279:41586-41593.

Bibliography

Reeves, C.D.: Production of hybrid 16-membered macrolides by expressing combinations of polyketide synthase genes in engineered *Streptomyces fradiae*. 2004, *Chem.Biol.* 11, 1465–1472.

Richard H Baltz.: Molecular engineering approaches to peptide, polyketide and other antibiotics, 2006, *Nature Biotechnology*, Volume 24 (12), 1533

Rinehart, K. L. Jr.; Shield, L. S.: Chemistry of the ansamycin antibiotics. 1976, *Fortschr. Chem. Org. Naturst.*, 33, 231.

Ryding NJ, Anderson TB, Champness WC: Regulation of the *Streptomyces coelicolor* calcium-dependent antibiotic by absA, encoding a cluster-linked two-component system. 2002, *J Bacteriol* 184:794-805.

Sambrook and Russell, 2001, *Molecular cloning: A laboratory manual*, Cold spring Harbour Laboratory Press.

S. Douthwaite.: Structure- activity realtionships of ketolides vs. macrolides 2001. *Clin. Microbiol. Infect.* 7, 11.

Shah, S.; Xue, Q.; Tang, L.; Carney, J. R.; Betlach, M.; McDaniel, R.: Cloning, characterization and heterologous expression of a polyketide synthase and P-450 oxidase involved in the biosynthesis of the antibiotic oleandomycin. 2000, *J. Antibiotics*, 53, 502.

Lesley S. Sheehan, Rachel E. Lill, Barrie Wilkinson, Rose M. Sheridan, William A. Vousden, Andrew L. Kaja, Gary D. Crouse, James Gifford, Paul R. Graupner, Laura Karr,‡ Paul Lewer, Thomas C. Sparks, Peter F. Leadlay,§ Clive Waldron, and Christine J. Martin.: Engineering of the Spinosyn PKS: Directing Starter Unit Incorporation, 2006, J. Nat. Prod., 69 (12), 1702 -1710.

Sheldon PJ, Busarow SB, Hutchinson CR: Mapping the DNA binding domain and target sequences of the *Streptomyces peucetius* daunorubicin biosynthesis regulatory protein, Dnrl. 2002, *Mol Microbiol* 44:449-460.

Bibliography

Shen B, Hutchinson CR.: Deciphering the mechanism for the assembly of aromatic polyketides by a bacterial polyketide synthase. **1996**, *Proc Natl Acad Sci USA* 93(13):6600.

Shen B, Hutchinson CR.: Tetracenomycin F2 cyclase: intramolecular aldol condensation in the biosynthesis of tetracenomycin C in *Streptomyces glaucescens*. **1993**, *Biochemistry* 32(41):11149.

Shen B., Hutchinson, C. R.: Enzymatic synthesis of a bacterial polyketide from acetyl and malonyl coenzyme A. **1993**, *Science*, 262(5139), 1535-40.

Sherman DH, Bibb MJ, Simpson TJ, Johnson D, Malpartida F, Frenandez-Moreno M, Martinez E, Hutchinson CR, Hopwood DA.: Molecular genetic analysis reveals a putative bifunctional polyketide cyclase/dehydrase gene from *Streptomyces coelicolor* and *Streptomyces violaceoruber*, and a cyclase/O-methyltransferase from *Streptomyces glaucescens*. **1991** *Tetrahedron* 47(31):6029.

Shwecke T, Aparcio JF, Molnar I, Konig A, Khaw LE, Haydock SF, Oliynyk M, CAffrey P, Cortes J, Lester JB., The biosynthetic gene cluster for Polyketide gene cluster Rapamycine **1995**, *PNAS USA*, 92: 7839- 7843.

Steven G Van Lanen and Ben Shen.: Microbial genomics for the improvement of natural product discovery. **2006**, *Current Opinion in Microbiology*, 9:252–260.V

Strohl WR.: *Biotechnology of antibiotics*, 1997, 2nd edn. Marcel Dekker, New York,

Strohl, W.R.; Dickens, M.L.; Rajgarhia, V.B.; Woo, A.J.; Priestley, N.D. In: *Biotechnology of Antibiotics* Strohl, W. R. (eds.) (1997) Anthracyclines.. Marcel Dekker Inc., New York, **1997**; pp 577-657.

Suarez, J. E.; Chater, K. F.: DNA cloning in *Streptomyces*: a bifunctional replicon comprising pBR322 inserted into a *Streptomyces* phage. **1980**, *Nature* 286(5772), 527.

Bibliography

Summers, R. G.; Ali, A.; Shen, B.; Wessels, W., Hutchinson, C. R.: Malonyl-coenzyme A:acyl carrier protein acyltransferase of *Streptomyces glaucescens*: a possible link between fatty acid and polyketide biosynthesis.. **1995**, *Biochemistry*, 34(29):9389-402.

Summers, R. G.; Donadio, S.; Staver, M. J.; Wendt-Pienkowski, E.; Hutchinson, C. R.; Katz, L.: Sequencing and mutagenesis of genes from the erythromycin biosynthetic gene cluster of *Saccharopolyspora erythraea* that are involved in L-mycarose and D-desosamine production. **1997**, *Microbiol.*, 143(pt 10), 3251.

Sun Y, Zhou X, Dong H, Tu G, Wang M, Wang B, Deng Z: A complete gene cluster from *Streptomyces nanchangensis* NS3226 encoding biosynthesis of the polyether ionophore nanchangmycin. **2003**, *Chem Biol* 10:431-441.

Takano E, Kinoshita H, Mersinias V, Bucca G, Hotchkiss G, Nihira T, Smith C, Bibb M, Wohlleben W, Chater KF: A bacterial hormone (the SCB1 extracellular signalling system) directly controls an antibiotic pathway-specific regulator in the cryptic type I polyketide biosynthetic cluster of *Streptomyces coelicolor* A3(2). **2005**, *Mol Microbiol* 56(2):465-79.

Thompson, C. J.; Ward, J. M.; Hopwood, D. A.: DNA cloning in *Streptomyces*: resistance genes from antibiotic-producing species. **1980**, *Nature* 286(5772), 525.
Tu D, Blaha G, Moore PB, Steitz TA.: Structures of MLSBK antibiotics bound to mutated large ribosomal subunits provide a structural explanation for resistance. **2005**, *Cell* 121: 257-270.

Uguru GC, Stephens KE, Stead JA, Towle JE, Baumberg S, McDowall KJ., Transcriptional activation of the pathway-specific regulator of the actinorhodin biosynthetic genes in *Streptomyces coelicolor*. **2005 Oct**, *Mol Microbiol*, 58(1):131-50.

Usdin,E., Shockman, G.D., and Toennies,G., (1954), Tetrazolium Bioautography, Appl. Microbiol, 2; 29-33

Bibliography

Vladimir Kren* and Ludmila Martíková.: Glycosides in Medicine: "The Role of Glycosidic Residue in Biological Activity". **2001**, *Current Medicinal Chemistry*, **8**, 1313-1338.

W. A. Barton, J. B. Biggins, J. Jiang, J. S. Thorson, D. B. Nikolov.: Expanding pyrimidine diphospho sugar libraries via structure based nucleotidyl transferase engineering. **2002**, *Proc. Natl Acad. ScL USA* **99**, 13397.

W. A. Barton, J. Lesniak, J. B. Biggins, P. D. Jeffrey, J. Jiang, K. R. Rajashankar, J. S. Thorson, D. B. Nikolov.: Structure, mechanism and engineering of nucleotidyl transferase as a first step toward glycorandomization **2001**, *Nature Struct. Biol.*, **8**, 545.

Wakil SJ.: Fatty acid synthase, a proficient multifunctional enzyme. **1989**, *Biochemistry* **28**(11):4523.

Widdick D, Dodd H, Barraille P, White J, Chater KF, Gasson M, Bibb MJ: Cloning and engineering of the cinnamycin biosynthetic gene cluster from *Streptomyces cinnamoneus cinnamoneus* DSM40005. **2005**, *Proc Natl Acad Sci USA* **100**:4316-4321.

Wietzorre A, Bibb M: A novel family of proteins that regulates antibiotic production in *streptomyces* appears to contain an OmpR-like DNA-binding fold. **1997**, *Mol Microbiol* **25**:1181-1184.

X. Fu, C. Albermann, J. Jiang, J. Liao, C. Zhang, J. S. Thorson.: Antibiotic optimisation via in vitro glycorandomization **2003**, *Nature Biotechnology*, **21**, 1467.

Xue, Y.; Zhao, L.; Liu, H.-w.; Sherman, D. H.: A gene cluster for macrolide antibiotic biosynthesis in *Streptomyces venezuelae*: architecture of metabolic diversity. **1998**, *Proc. Natl. Acad. Sci. U.S.A.* **95**(21), 12111.

Bibliography

Yamanaka K, Oikawa H, Ogawa HO, Hosono K, Shinmachi F, Takano H, Sakuda S, Beppu T, Ueda K., Desferrioxamine E produced by *Streptomyces griseus* stimulates growth and development of *Streptomyces tanashiensis*. 2005 Sep, *Microbiology*, 151(Pt 9):2899-905.

Yamazaki H, Tomono A, Ohnishi Y, Horinouchi S: DNA-binding specificity of AdpA, a transcriptional activator in the A-factor regulatory cascade in *Streptomyces griseus*. 2004, *Mol Microbio.*, 53:555-572.

Yu, T.-W. Ph.D. Thesis, University of East Anglia, Norwich, 1995.

Yuema Shen,^{*†} Pall Yoon,^{*} Tin-Wein Yu,^{*‡} Heinz G. Floss,^{*} David Hopwood,[‡] and Bradley S. Moore.: Ectopic expression of the minimal *whiE* polyketide synthase generates a library of aromatic polyketides of diverse sizes and shapes, 1999, *Proc Natl Acad Sci U S A*. March 30; 96(7): 3622-3627.

Ziermann R, Betlach MC.: Recombinant polyketide synthesis in Streptomyces: engineering of improved host strains. 1999, *BioTechniques*, 26:106