

University of Marine Science and Technology

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[3] Diseases Caused By Bacterial Pathogens In
Inland Water

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ECP : Extracellular products,

SDS-PAGE : Sodium dodecylsulphate-polyacrylamide gel electrophoresis

Bibliography

Bibliography (Section 1: Inland Water Streptococcosis)

- Bowater, R. O., Forbes-Faulkner, J., Anderson, I. G., Condon, K., Robinson, B., Kong, F., Gilbert, G. L., Reynolds, A., Hyland, S., McPherson, G., O'Brien, J. and Blyde, D. (2012) Natural outbreak of *Streptococcus agalactiae* (GBS) infection in wild giant Queensland grouper, *Epinephelus lanceolatus* (Bloch), and other wild fish in northern Queensland, Australia. *Journal of Fish Diseases*, 35, 173-186.
- Collins, M. D., Ash, C., Farrow, J. A. E., Wallbanks, S. and Williams, A. M. (1989) 16S ribosomal ribonucleic acid sequence analysis of lactococci and related taxa. Description of *Vagococcus fluvialis* gen. nov., sp. nov. *Journal of Applied Bacteriology* 67, 453-460.
- Daly, J. G.(1999) Other bacterial pathogens. In: P.T.K. Woo and D.W. Bruno (eds), *Fish Diseases and Disorders. Volume 3. Viral, Bacterial and Fungal Infections*, (CABI Publishing, Wallingford), 577-598.
- Delannoy, C. M. J., Zadok, R. N., Lainson, F. A., Ferguson, H. W., Crumlish, M., Turnbull, J. F. and Fontaine, C. (2012) Draft genome sequence of a nonhemolytic fish-pathogenic *Streptococcus agalactiae* strain. *Journal of Bacteriology*, 194, 6341-6342.
- Eldar, A., Bejerano, Y. and Bercovier, H. (1994) *Streptococcus shiloi* and *Streptococcus difficile*: Two new Streptococcal species causing a meningoencephalitis in fish. *Current Microbiology*, Vol., 139-143.
- Evans, J. J., Klesius, P. H., Gilbert, P. M., Shoemaker, C. A., Al Sarawi, M. A., Landsberg, J., Duremdez, R., Al Marzouk, A and Al Zenki, S. (2002) Characterization of beta- hemolytic group B *Streptococcus agalactiae* in cultured seabream, *Sparus auratus* L., and wild mullet, *Liza Klunzingeri* (Day), in Kuwait. *Journal of Fish Diseases*, 25, 505-513.
- Evans, J. J., Klesius, P. H., and Shoemaker, C. A. (2004) Efficacy of *Streptococcus agalactiae* (groupB) vaccine in tilapia (*Oreochromis niloticus*) by intraperitoneal and bath immersion administration. *Vaccine*, 22, 3769-3773.
- Evans, J. J., Bohnsack, J. F., Klesius, P. H., Whiting, A. A., Garcia, J. C., Shoemaker, C. A. and Takahashi, S. (2008) Phylogenetic relationship among *Streptococcus agalactiae* isolated from piscine, dolphin, bovine and human sources: a dolphin and piscine lineage associated with a fish epidemic in Kuwait is also associated with human neonatal infections in Japan. *Journal of Medical Microbiology*, 57, 1369-1376.
- Evans, J.J., Pasnik, D.J. and Klesius, P.H. (2010) A commercial rapid optical immunoassay detects *Streptococcus agalactiae* from aquatic cultures and clinical specimens. *Veterinary Microbiology*, 144, 422-428.
- Filho, C. I., Muller, E. E., Pretto-Giordano, L. G. and Bracarense, A. P. F. F. L. (2009) Histological findings of experimental *Streptococcus agalactiae* infection in nile tilapia (*Oreochromis niloticus*). *Brazilian Journal of Veterinary Pathology*, 2(1), 12-15.
- Geng, Y., Wang, K. Y., Huang, X. L., Chen, D. F., Li, C. W., Ren, S. Y., Liao, Y. T., Zhou, Z. Y., Liu, Q. F., Du, Z. J. and Lai, M. (2012) *Streptococcus agalactiae*, an emerging pathogen for cultured ya-fish, *Schizothorax prenati*, in China. *Transboundary and Emerging Diseases*, 59, 369-375.
- Kawamura, Y., Itoh, Y., Mishima, N., Ohkusu, K., Kasai, H. and Ezaki, T. (2005) High genetic similarity of *Streptococcus agalactiae* and *Streptococcus difficilis*: *S. difficilis* Eldar et al. 1995 is a later synonym of *S. agalactiae* Lehmann and Neumann 1896 (Approved Lists 1980). *International of Journal of Systematic and Evolutionary Microbiology*, 55, 961-965.
- Kawata, K., Anzai, T., Senna, K., Kikuchi, N., Ezawa, A. and Takahashi, T. (2004) Simple and rapid PCR method for identification of streptococcal species relevant to animal infections based on 23S rDNA sequence. *FEMS Microbiology Letters*, 237, 57-64.

- Mian, G. F., Godoy, D. T., Leal, C. A. G., Yuhara, T. Y., Costa, G. M. and Figueiredo, H. C. P. (2009) Aspects of the natural history and virulence of *S. agalactiae* infection in Nile tilapia. *Veterinary Microbiology*, 136, 180-183.
- Michel, C., Nougayrede, P., Eldar, A., Sochon, E. and de Kinkelin, P. (1997) *Vagococcus salmoninarum*, a bacterium of pathological significance in rainbow trout *Oncorhynchus mykiss* farming. *Diseases of Aquatic Organisms*, 30, 199-208.
- Pereira, U. P., Mian, G. F., Oliveira, I. C. M., Benchettit, L. C., Costa, G. M. and Figueiredo, H. C. P. (2010) Genotyping of *Streptococcus agalactiae* strains isolated from fish, human and cattle and their virulence potential in Nile tilapia. *Veterinary Microbiology*, 140, 186-192.
- Schmidtke, L. M. and Carson, J. (1994) Characterization of *Vagococcus salmoninarum* isolated from diseases salmonid fish. *Journal of Applied Bacteriology*, 77, 229-236.
- Shewmaker, P. L., Camus, A. C., Bailiff, T., Steigerwalt, A. G., Morey, R. E. and Carvalho, M. da G. S. (2007) *Streptococcus ictaluri* sp. nov., isolated from channel catfish *Ictalurus punctatus* broodstock. *International Journal of Systematic Microbiology*, 57, 1603-1606
- Shome, B. R., Mitra, S. D., Bhuvana, M., Krishiga, N., Velu, D., Shome, R., Isloor, S., Barbuddhe, S. B. and Rahman, H. (2011) Multiplex PCR assay for species identification of bovine mastitis pathogens. *Journal of Applied Microbiology*, 111, 1349-1356
- Vandamme, P., Devriese, L. A., Pot, B., Kersters, K. and Melin, P. (1997) *Streptococcus difficile* is a nonhemolytic group B type Ib *Streptococcus*. *International Journal of Systematic Bacteriology*, Vol., 47, 81-85.
- Wallbanks, S., Martinez-Murcia, A. J., Fryer, J. L., Philips, B. A. and Collins, M. D. (1990) 16S rRNA sequence determination for members of the genus *Carnobacterium* and related lactic acid bacteria and description of *Vagococcus salmoninarum* sp. nov. *International Journal of Systematic Bacteriology*, Vol. 40, 224-230.
- Williams, A., Fryer, J. L. and Collins, M. D. (1990) *Lactococcus piscium* sp. nov. a new *Lactococcus* species from salmonid fish. *FEMS Microbiology Letters*, 68, 109-114.

Bibliography (Section 2: Furunculosis)

- Bernoth E. M. (1997). Furunculosis: the history of the disease and of disease research. In *Furunculosis, Multidisciplinary Fish Disease Research*. Bernoth E. M., Ellis A., Midtlyng P., Olivier G. and Smith P. (Eds.). Academic Press, London. 1-20.
- Schachte J. H. (2002). *Furunculosis*. New York Department of Environmental Conservatory. Rome. NY. Chapter 25, 211-216.
- Toranzo A. E., Magarinos B. and Romalde J. L. (2005). A review of the main bacterial fish diseases in mariculture systems. *Aquaculture* 246, 37-61.
- Cipriano R. C. and Bullock G. L. (2001). Furunculosis and other diseases caused by *Aeromonas salmonicida*. U. S. Geological Survey Fish Disease Leaflet. Leetown. 66, 33p.
- Wiklund T. and Dalsgaard I. (1998). Occurrence and significance of atypical *Aeromonas salmonicida* in non-salmonid and salmonid fish species: a review. *Diseases of Aquatic Organisms* 32, 49-69.
- Department of Agriculture, Fisheries and Forestry (2009). Disease strategy: Furunculosis (*Aeromonas salmonicida* subsp. *salmonicida*) (Version 2). In Australian Aquatic Veterinary Emergency Plan (AQUAVETPLAN), Australian Government Department of Agriculture, Fisheries and Forestry. Canberra. ACT, 80p.
- Griffin P. J., Snieszko S. F. and Friddle S. B. (1953). A more comprehensive description of *Bacterium salmonicida*. *Transactions of the American Fisheries Society* 82, 129-138.
- Martin-Carnahan A. and Joseph S.W. (2005). *Aeromonadaceae*. In *Bergey's manual of systematic bacteriology* Volume 2. 2nd edition. Garrity G. M.(Ed.) Springer-Verlag. New York, NY 5, 556-580.
- Austin B. (2011) . Taxonomy of bacterial fish pathogens. *Veterinary Research* 42, 20.

- Reith M. E., Singh R. K., Curtis B., Boyd J. M., Bouevitch A., Kimball J., Munholland J., Murphy C., Sarty D., Williams J., Nash J. H., Johnson S. C. and Brown L. L. (2008). The genome of *Aeromonas salmonicida* subsp. *salmonicida* A449: insights into the evolution of a fish pathogen. *BMC Genomics* 9, 427.
- Popovic N. T., Coz-Rakovac R. and Strunjak-Perovic I. (2007). Commercial phenotypic tests (API 20E) in diagnosis of fish bacteria: a review. *Veterinarni Medicina* 52, 49-53.
- Austin B. and Austin D. A. (2012). *Bacterial fish pathogens: disease of farmed and wild fish*, 5th edition, Springer Praxis, Chichester. 652p.
- Gustafson C. E., Thomas C. J. and Trust T. J. (1992). Detection of *Aeromonas salmonicida* from fish by using polymerase chain reaction amplification of the virulence surface array protein gene. *Applied and Environmental Microbiology* 58, 3816-3825.
- Beaz-Hidalgo R. and Figueras M. J. (2012). Molecular detection and characterization of furunculosis and other *Aeromonas* fish infections. In Health and Environment in Aquaculture. Carvalho E. D., David S. D. and Silva R. J. (Eds.) InTech. *Shanghai*. Chapter 4, 97-132p. Available from: <http://www.intechopen.com/books/healthand-environment-in-aquaculture/updated-information-of-aeromonas-infections-and-furunculosis-derived-frommolecular-methods->
- USFWS. (1995). *U. S. Fish and Wildlife Service, Fisheries: Fish Health Operations*. U. S. Department of the Interior. Washington DC. FWM170, Part 713 FW, PP 1-4.
- Press C. M., Evensen Ø., Reitan L. J. and Landsverk T. (1996). Retention of furunculosis vaccine components in Atlantic salmon, *Salmo salar* L., following different routes of vaccine administration. *Journal of Fish Diseases* 19, 215-224.
- Austin B. (1997). Progress in understanding the fish pathogen *Aeromonas salmonicida*. *Trends in Biotechnology* 15, 131-134.
- Tam B., Gough W. A. and Tsuji L. (2011). The impact of warming on the appearance of furunculosis in fish of the James Bay region, Quebec, Canada. *Regional Environmental Change* 11, 123-132.

Bibliography (Section 3. Bacterial Gill Disease)

- Anacker R.L. and Ordal E.J. (1959). Studies on the myxobacterium *Chondrococcus columnaris*. I. Serological typing. *Journal of Bacteriology* 78, 25-32.
- Bernardet J.-F., Segers S., Vancanneyt M., Berthe F., Kersters K. and Vandamme P. (1996). Cutting a Gordian knot: emended classification and description of the genus *Flavobacterium*, emended description of the family *Flavobacteriaceae*, and proposal of *Flavobacterium hydatis* nom. nov. (Basonym, *Cytophaga aquatilis* Strohl and Tai 1978). *International journal of systematic bacteriology* 46, 128-148.
- Bowker J.D. and Carty D.G. (2008). Efficacy of chloramine-T to control mortality in freshwater-reared salmonids diagnosed with bacterial gill disease. *North American Journal of Aquaculture* 70, 20-26.
- Bowker J.D. and Carty D.G. (2011). Chloramin-T margin-of-safety estimates for fry, fingerling, and juvenile rainbow trout. *North American Journal of Aquaculture* 73, 259-569.
- Bullock G.L., Herman R.L. and Waggy C. (1991). Hatchery efficacy trials with chloramine-T to control mortality in freshwater-reared salmonids. *Journal of Aquatic Animal Health* 3, 48-50.
- Bullock G.L. (1972). Studies on selected myxobacteria pathogenic for fishes and on bacterial gill disease in hatchery-reared salmonids. Technical Papers of the United States Fish and Wildlife Service 60, 30pp.
- Bullock G.L. (1990). Bacterial gill disease of freshwater fishes. *U.S. Fish and Wildlife Service Fish Disease Leaflet* 84, 3 pp.
- Daoust P.-Y. and Ferguson H.W. (1983). Gill diseases of cultured salmonids in Ontario. *Canadian Journal of Comparative Medicine* 47, 358-362.
- Davis H.S. (1926). A new gill disease of trout. *Transactions of the American Fisheries Society* 56, 156-160.
- Davis H.S. (1927). Further observations of the gill disease of trout. *Transactions of the American Fisheries Society* 57, 210-212.

- DerkSEN J.A., Ostland V.E. and Ferguson H.W. (1999). Effects of hydrogen peroxide on clearance of formalin-killed *Flavobacterium branchiophilum* from the gills of rainbow trout, *Oncorhynchus mykiss* (Walbaum). *Journal of Fish Diseases* 22, 59-67.
- Farkas J. and Olah J. (1985). Filamentous *Flavobacterium* sp. isolated from fish with gill diseases in cold water. *Aquaculture* 44, 1-10.
- Ferguson H.W., Ostland V.E., Byre P. and Lumsden J.S. (1991). Experimental production of bacterial gill disease in trout by horizontal transmission and bath challenge. *Journal of Aquatic Animal Health* 3, 118-123.
- Heo G.-J., Wakabayashi H. and Watabe S. (1990). Purification and characterization of pili from *Flavobacterium branchiophila*. *Fish Pathology* 25, 21-27.
- Heo G.-J., Kasai K. and Wakabayashi H. (1990). Occurrence of *Flavobacteriu branchiopha* associated with bacterial gill disease at a trout hatchery. *Fish Pathology* 25, 99-105.
- Huh G.-J. and Wakabayashi H. (1987). Detection of *Flavobacterium* sp., a pathogen of bacterial gill disease, using indirect fluorescent antibody technique. *Fish Pathology* 22, 215-220.
- Huh G.-J. and Wakabayashi H. (1989). Serological characteristics of *Flavobacterium branchiophila* isolated from gill diseases of freshwater fishes in Japan, USA, and Hungary. *Journal of Aquatic Animal Health* 1, 142-147.
- Kimura N., Wakabayashi H. and Kudo S. (1978). Studies on bacterial gill disease in salmonids-I. Selection of bacterium transmitting gill disease. *Fish Pathology* 12, 233-242.
- Ko Y.-M. and Heo G.-J. (1997). Characteristics of *Flavobacteum branchiophilum* isolated from rainbow trout in Korea. *Fish Pathology* 32, 97-102.
- Kudo S. and Kimura N. (1983a). Ultrastructural studies on bacterial gill disease in rainbow trout fingerlings - III. Recovery from hyperplasia in a natural infection. *Bulletin of the Japanese Society for the Science of Fish* 49, 1627-1633.
- Kudo S. and Kimura N. (1983b). Ultrastructural studies on bacterial gill disease in rainbow trout fingerlings - IV. Recovery from hyperplasia in an artificial infection. *Bulletin of the Japanese Society for the Science of Fish* 49, 1634-1641.
- Kudo S. and Kimura N. (1983c). Utrastructural studies on bacterial gill disease in rainbow trout fingerlings - V. Extraction of a hyperplasia-inducing factor. *Bulletin of the Japanese Society for the Science of Fish* 49, 1777-1782.
- Lumsden J.S., Ostland V.E. and Ferguson H.W. (1998). Use of hydrogen peroxide to treat experimentally induced bacterial gill disease in rainbow trout. *Journal of Aquatic Animal Health* 10, 230-240.
- MacPhee D.D., Ostland V.E., Lumsden J.S. and Ferguson H.W. (1995). Development of an enzyme-linked immunosorbent assay (ELISA) to estimate the quantity of *Flavobacterium branchiophilum* on the gills of rainbow trout *Oncorhynchus mykiss*. *Diseases of Aquatic Organisms* 21, 13-23.
- Ostland V.E., Ferguson H.W., Prescott J.F., Stevenson R.M.W. and Barker I.K. (1990). Bacterial gill disease of salmonids ; relationship between the severity of gill lesions and bacterial recovery. *Diseases of Aquatic Organisms* 9, 5-14.
- Ostland V.E., Lumsden J.S., MacPhee D.D., Derksen J.A. and Ferguson H.W. (1997). Inhibition of the attachment of *Flavobacterium branchiophilum* to the gills of rainbow tout, *Oncorhynchus mykiss* (Walbaum). *Journal of Fish Diseases* 20, 109-117.
- Ostland V.E., MacPhee D.D., Lumsden J.S. and Ferguson H.W. (1995). Virulence of *Flavobacteium branchiophilum* in experimentally infected salmonids. *Journal of Fish Diseases* 18, 249-262.
- Ostland V.E., Byrne P.J., Lumsden J.S., MacPhee D.D., Derksen J.A., Haulena M., Skar K., Myhr E. and Ferguson H.W. (1999). Atypical bacterial gill disease: a new form of bacterial gill disease affecting intensively reared salmonids. *Journal of Fish Diseases* 22, 351-358.

- Ostland V.E., Lumsden J.S., MacPhee D.D. and Ferguson H.W. (1994). Characteristics of *Flavobacterium branchiophilum*, the cause of salmonid bacterial gill disease in Ontario. *Journal of Aquatic Animal Health* 6, 13-26.
- Ototsake M. and Wakabayashi H. (1985). Characteristics of extracellular products of *Flavobacterium* sp. a pathogen of bacterial disease. *Fish Pathology* 20, 167-171.
- Rach J.J., Gaikowski M.P. and Ramsay R.T. (2000). Efficacy of hydrogen peroxide to control mortalities associated with bacterial gill disease infections on hatchery-reared salmonids. *Journal of Aquatic Animal Health* 12, 119-127.
- Rucker R.R., Johnson H.E. and Ordal E.J. (1952). An interim report on gill disease. *Progressive Fish-Culturist* 14, 10-14.
- Snieszko S.F. (1981). Bacterial gill disease of freshwater fishes. *U.S. Fish and Wildlife Service Fish Disease Leaflet* 62, 11 pp.
- Spear D.J. and Ferguson H.W. (1989). Clinical and pathological features of common gill disease of cultured salmonids in Ontario. *Canadian Veterinary Journal* 30, 882-887.
- Spears D.J., Ferguson H.W., Beamish F.W.M., Yager J.A. and Yamashiro S. (1991). Pathology of bacterial gill disease: sequential development of lesions during natural outbreaks of disease. *Journal of Fish Diseases* 14, 21-32.
- Touchon M., Barbier P., Bernardet J.-F., Loux V., Vacherie B., Barbe V., Rocha E.P. and Duchaud E. (2011). Complete genome sequence of the fish pathogen *Flavobacterium branchiophilum*. *Appl. Environ. Microbiology* 77, 7656-7662.
- Toyama T., Kita-Tsukamoto K. and Wakabayashi H. (1996). Identification of *Flexibacter maritimus*, *Flavobacterium branchiophilum* and *Cytophaga columnaris* by PCR targeted 16S ribosomal DNA. *Fish Pathology* 9, 25-31.
- Turnbull J.F. (1993). *Bacterial gill disease and fin rot*. In: *Bacterial Diseases of Fish*, pp.40-57, Inglis V., Roberts R.J. and Bromage N.R. (eds.), Blackwell Scientific Publishing, London, UK.
- Von Graevenitz A. (1990). Revised nomenclature of *Campylobacter laridis*, *Enterobacter intermedium*, and “*Flavobacterium branchiophila*”. *International journal of systematic bacteriology* 40, 211.
- Wakabayashi H. and Iwado T. (1985a). Effects of a bacterial gill disease on the respiratory functions of juvenile rainbow trout. In: *Fish and Shellfish Pathology*, pp.153-160, Ellis A.E. (eds.), Academic Press, London, UK.
- Wakabayashi H. and Iwado T. (1985b). Changes in glycogen, pyruvate and lactate in rainbow trout with bacterial gill disease. *Fish Pathology* 20, 161-165.
- Wakabayashi H., Huh G.J. and Kimura N. (1989). *Flavobacterium branchiophila* sp. nov., a causative agent of bacterial gill disease of freshwater fishes. *International journal of systematic bacteriology* 39, 213-216.
- Wakabayashi H., Egusa S. and Fryer J.L. (1980). Characteristics of Filamentous bacteria isolated from a gill disease of salmonids. *Canadian Journal of Fisheries and Aquatic Sciences* 37, 1499-1504.
- Wood E.M. and Yasutake W.T. (1957). Histopathology of fish. V. Gill disease. *Progressive Fish-Culturist* 19, 7-13.

Bibliography (Section 4. Columnaris Disease)

- Altinok I. (2004). Toxicity and therapeutic effects of chloramine-T for treating *Flavobacterium columnare* infection of goldfish. *Aquaculture* 239, 47-59.
- Altinok I. and Grizzle J.M. (2001). Effects of low salinities on *Flavobacterium columnare* infection of euryhaline and freshwater stenohaline fish. *Journal of Fish Diseases* 24, 361-367.
- Amend D.F. (1970). Myxobacterial infections of salmonids: Prevention and treatment. In: A Symposium on Diseases of Fishes and Shellfishes, pp.258-265, Snieszko S.F. (ed.), American Fisheries Society, Washington, DC, USA.

- Anacker R.L. and Ordal E.J. (1959a). Studies on the myxobacterium *Chondrococcus columnaris*: II. Bacteriocins. *Journal of Bacteriology* 78, 33-40.
- Anacker R.L. and Ordal E.J. (1959b). Studies on the myxobacterium *Chondrococcus columnaris*: I. Serological typing. *Journal of Bacteriology* 78, 25-32.
- Anderson J.I.W. and Conroy D.A. (1969). The pathogenic myxobacteria with special reference to fish disease. *Journal of Applied Bacteriology* 32, 30-39.
- Arias C.R., Welker T.L., Shoemaker C.A., Abernathy J.W. and Klesius P.H. (2004). Genetic fingerprinting of *Flavobacterium columnare* isolates from cultured fish. *Journal of Applied Bacteriology* 97, 421-428.
- Bader J.A., Nusbaum K.E. and Shoemaker C.A. (2003). Comparative challenge model of *Flavobacterium columnare* using abraded and unabraded channel catfish, *Ictalurus punctatus* (Rafinesque). *Journal of Fish Diseases* 26, 461-467.
- Bernardet J.-F. (1989). 'Flexibacter columnaris' ; first description in France and comparison with bacterial strains from other origins. *Diseases of Aquatic Organisms* 6, 37-44.
- Bernardet J.-F. and Grimont P.A.D. (1989). Deoxyribonucleic acid relatedness and phenotypic characterization of *Flexibacter columnaris* sp. nov., nom. Rev., *Flexibacter psychrophilus* sp. nov., nom. rev., and *Flexibacter maritimus* Wakabayashi, Hikida & Masumura, 1986. *International Journal of Systematic Bacteriology* 39, 346-354.
- Bernardet J.-F. and Bowman J.P. (2011). Genus I. *Flavobacterium* Bergey, Harrison, Breed, Hammer and Huntoon 1923, 97^{AL} emend. Bernardet, Segers, Vancanneyt, Berthe, Kersters and Vandamme 1996, 139. In: *Bergey's Manual of Systematic Bacteriology*, Second Edition Vol. 4, 112-154.
- Bernardet J.-F., Segers J.P., Vancanneyt M., Berthe F., Kersters K. and Vandamme P. (1996). Cutting a gordian knot: emended classification and description of the genus *Flavobacterium*, emended description of the family *Flavobacteriaceae*, and proposal of *Flavobacterium hydatis* nom. nov. (basonym, *Cytophaga aquatilis* Strohl and Tait 1978). *International Journal of Systematic Bacteriology* 46, 128-148.
- Bernoth E.-M. and Kortig W. (1989). First report of *Flexibacter columnaris* in tench (*Tinca tinca*, L.) in Germany. *Bulletin of the European Association of Fish Pathologists* 9, 125-127.
- Bertolini J.M. and Rohovec J.S. (1992). Electrophoretic detection of proteases from different *Flexibacter columnaris* strains and assessment of their variability. *Diseases of Aquatic Organisms* 12, 121-128.
- Bootsma R. and Clerx J.P.M. (1976). Columnaris disease of cultured carp *Cyprinus carpio* L. characterization of the causative agent. *Aquaculture* 7, 371-384.
- Bowser P.R. (1973). Seasonal prevalence of *Chondrococcus columnaris* infection in black bullheads from Clear Lake, Iowa. *Journal of wildlife diseases* 9, 115-119.
- Chowdhury M.B.R. and Wakabayashi H. (1988a). Effects of sodium, potassium, calcium and magnesium ions on the survival of *Flexibacter columnaris* in water. *Fish Pathology* 23, 231-235.
- Chowdhury M.B.R. and Wakabayashi H. (1988b). Effects of sodium, potassium, calcium and magnesium ions on the survival of *Flexibacter columnaris* infection in fish. *Fish Pathology* 24, 9-15.
- Chowdhury M.B.R. and Wakabayashi H. (1989). A study on the mechanism of the bacterial competitive effects on *Flexibacter columnaris* infection: Effects of the time-lag between the exposures of fish to *F. columnaris* and its competitor. *Fish Pathology* 24, 105-110.
- Chun S.K., Park C.Y. and Lee S.K. (1985). Characteristics of *Flexibacter columnaris* isolated from tilapia (*Tilapia* sp.). *Bulletin of the Korean Fisheries Society* 18, 369-373.
- Colgrove D.J. and Wood J.W. (1966). Occurrence and control of *Chondrococcus columnaris* as related to Fraser River sockeye salmon. Progress Report of International Pacific Salmon Fisheries Commission No.15, 51pp.
- Darwish A.M. and Mitchell A.J. (2009). Evaluation of diquat against an acute experimental infection of *Flavobacterium columnare* in channel catfish, *Ictalurus punctatus* (Rafinesque). *Journal of Fish Diseases* 32, 401-408.

- Darwish A.M., Bebak J.A. and Schrader K.K. (2012). Assessment of Aquaflor , copper sulfate and potassium permanganate for control of *Aeromonas hydrophila* and *Flavobacterium columnare* infection in sunshine bass, *Morone chrysops* female ×*Morone saxatilis* male. *Journal of Fish Diseases* 35, 637-647.
- Davis H.S. (1922). A new bacterial disease of freshwater fishes. *Bulletin of the United States Bureau of Fisheries* 38, 261-280.
- Decostere A., Haesebrouck F., Turnbull J.F. and Charlier G. (1999a). Influence of water quality and temperature on adhesion of high and low virulence *Flavobacterium columnare* strains to isolated gill arches. *Journal of Fish Diseases* 22, 1-11.
- Decostere A., Haesebrouck F., Van Driessche E., Charlier G. and Ducatelle R. (1999b). Characterization of the adhesion of *Flavobacterium columnare* (*Flexibacter columnaris*) to gill tissue. *Journal of Fish Diseases* 22, 465-474.
- Farmer B.D., Mitchell A.J. and Straus D.L. (2011). The effect of high ammonia concentration on the survival of channel catfish experimentally infected with *Flavobacterium columnare*. *Journal of Aquatic Animal Health* 23, 162-168.
- Ferguson H.W. (1977). Columnaris disease in rainbow trout (*Salmo gairdneri*) in Northern Ireland. *Veterinary Record* 101, 55-56.
- Figueiredo H.C.P., Klesius P.H., Arias C.R., Evans J., Shoemaker C.A., Pereira Jr D.J. and Peixoto M.T. (2005). Isolation and characterization of strains of *Flavobacterium columnare* from Brazil. *Journal of Fish Diseases* 28, 199-204.
- Fijian N.N. (1968). The survival of *Chondrococcus columnaris* in waters of different quality. *Bulletin of the Office International des Epizooties* 69, 1158-1166.
- Fish F.F. and Rucker R.R. (1943). Infectious disease of Pacific salmon. *Transactions of the American Fisheries Society* 83, 297-312.
- Garnjobst L. (1945). *Cytophaga columnaris* (Davis) in pure culture: a myxobacterium pathogenic to fish. *Journal of Bacteriology* 49, 113-128.
- Gaunt P.S. and Gao D. (2010). Efficacy of florfenicol for control of mortality caused by *Flavobacterium columnare* infection in channel catfish. *Journal of Aquatic Animal Health* 22, 115-122.
- Gloff J.M. and LaPatra S.E. (2000). Infectious diseases impacting the commercial culture of salmonids. *Journal of Applied Aquaculture* 10, 17-90.
- Griffin B.R. (1991). Characteristics of a chondroitin AC lyase produced by *Cytophaga columnaris*. *Transactions of the American Fisheries Society* 120, 391-395.
- Hanson L.A. and Grizzle J.M. (1985). Nitrite-induced predisposition of channel catfish to *Flexibacter columnaris* infection. *Progressive Fish-Culturist* 47, 98-101.
- Holt R.A., Sanders J.E., Zinn J.L., Fryer J.L. and Pilcher K.S. (1975). Relation of water temperature to *Flexibacter columnaris* infection in steelhead trout (*Salmo gairdneri*), coho (*Oncorhynchus kisutch*) and Chinook (*O. tshawytscha*) salmon. *Journal of the Fisheries Research Board of Canada* 32, 1553-1559.
- Klesius P.H., Shoemaker C.A. and Evans J.J. (2008). *Flavobacterium columnare* chemotaxis to channel catfish mucus. *FEMS Microbiology Letters* 288, 216-220.
- Koski P., Hirvela-Koski V. and Bernardet J.-F. (1993). *Flexibacter columnaris* infection in arctic char (*Salvelinus alpinus* (L.)). First isolation in Finland. *Bulletin of the European Association of Fish Pathologists* 13, 66-69.
- Kuntu H.M.T., Suomalainen L.-R., Jokinen E.I. and Valtonen E.T. (2009). *Flavobacterium columnare* colony types: Connection to adhesion and virulence? *Microbial Pathogenesis* 46, 21-27.
- Leadbetter E.R. (1974). Genus II. *Flexibacter* Soriano 1945, 92, Levin 1969, 192 emend.mut. char. In: Bergey's Manual of Determinative Bacteriology, 8th edition, pp105-107, Buchanan R.E. and Gibbons M.E. (eds.), The Williams and Wilkins Co., Baltimore, USA.

- Michel C., Messiaen S. and Bernardet J.-F. (2002). Muscle infections in imported neon tetra, *Paracheirodon innesi* Myers: limited occurrence of microsporidia and predominance of severe forms of columnaris disease caused by an Asian genovovar of *Flavobacterium columnare*. *Journal of Fish Diseases* 25, 253-263.
- Moor A.A., Eimers M.E. and Cardell M.A. (1990). Attempts to control *Flexibacter columnaris* epizootics in pond-reared channel catfish by vaccination. *Journal of Aquatic Animal Health* 2, 109-111.
- Morrison C., Cornick J., Shum G. and Zwicker B. (1981). Microbiology and histopathology of 'saddleback' disease of underyearling Atlantic salmon, *Salmo salar* L. *Journal of Fish Diseases* 4, 243-258.
- Newton J.C., Wood T.M. and Hartley M.M. (1997). Isolation and partial characterization of extracellular proteases produced by isolates of *Flavobacterium columnare* derived from channel catfish. *Journal of Aquatic Animal Health* 9, 75-85.
- Nigrelli R.F. and Hutner S.H. (1945). The presence of a myxobacterium, *Chondrococcus columnaris* (Davis) Ordal and Rucker (1944), on *Fundulus heteroclitus* (Linn.). *Zoologica* 30, 101-105.
- Olivares-Fuster O., Shoemaker C.A., Klesius P.H. and Arias C.R. (2007). Molecular typing of isolates of the fish pathogen, *Flavobacterium columnare*, by single-strand conformation polymorphism analysis. *FEMS Microbiology Letters* 269, 63-69.
- Olivares-Fuster O. and Arias C.R. (2011). Development and characterization of rifampicin-resistant mutants from high virulent strains of *Flavobacterium columnare*. *Journal of Fish Diseases* 34, 385-394.
- Olivares-Fuster O., Bullard S.A., McElwain A., Llosa M.J. and Aris C.R. (2011). Adhesion dynamics of *Flavobacterium columnare* to channel catfish *Ictalurus punctatus* and zebrafish *Danio rerio* after immersion challenge. *Diseases of Aquatic Organisms* 96, 221-227.
- Ordal E.J. and Rucker R.R. (1944). Pathogenic myxobacteria. *Proceedings of the Society for Experimental Biology and Medicine* 56, 15-18.
- Pacha R.E. and Ordal E.J. (1963). Epidemiology of columnaris disease in salmon. *Bacteriological proceedings* 63, 3-4.
- Pacha R.E. and Ordal E.J. (1970). Myxobacterial diseases of salmonids. In: A Symposium on Diseases of Fishes and Shellfishes, pp.243-247, Snieszko S.F. (ed.), The American society, Special Publications (5). Washington, DC, USA.
- Panangala V.S., Shelby R.A., Shoemaker C.A., Klesius P.H., Mitra A. and Morrison E.E. (2006). Immunofluorescent test for simultaneous detection of *Edwardsiella ictaluri* and *Flavobacterium columnare*. *Diseases of Aquatic Organisms* 68, 197-207.
- Panangala V.S., Shoemaker C.A., van Santen V.L., Dybvig K. and Klesius P.H. (2007). Multiplex-PCR for simultaneous detection of 3 bacterial fish pathogens, *Flavobacterium columnare*, *Edwardsiella ictaluri*, and *Aeromonas hydrophila*. *Diseases of Aquatic Organisms* 74, 199-208.
- Reichenbach H. (1989). C Genus I. *Cytophaga* Winogradsky 1929, 577, emend. In: *Bergey's Manual of Systematic Bacteriology*, vol. 3., Staley J.T., pp.2015-2050, Bryant M.P., Pfennig N. and Holt J.G. (eds.), The Williams & Wilkins Co., Baltimore, USA.
- Schachte R. and Mora E.C. (1973). Production of agglutinating antibodies in channel catfish (*Ictalurus punctatus*) against *Chondrococcus columnaris*. *Journal of the Fisheries Research Board of Canada* 30, 116-118.
- Scheck J.L. and Caslake L. (2006). Genetic diversity of *Flavobacterium columnare* isolated from fish collected from warm and cold water. *Journal of Fish Diseases* 29, 245-248.
- Shoemaker C.A., Shelby R.A. and Klesius P.H. (2003a). Development of an indirect ELISA to detect humoral response to *Flavobacterium columnare* infection of channel catfish, *Ictalurus punctatus*. *Journal of Applied Aquaculture* 14, 43-52.
- Shoemaker C.A., Klesius P.H., Lim C. and Yildirim M. (2003b). Feed deprivation of channel catfish, *Ictalurus punctatus* (Pafinesque), influences organosomatic indices, chemical composition and susceptibility to *Flavobacterium columnare*. *Journal of Fish Diseases* 26, 553-561.

- Shoemaker C.A., Olivares-Fuster O., Arias C.R. and Klesius P.H. (2008). *Flavobacterium columnare* genomovar influences mortality in channel catfish (*Ictalurus punctatus*). *Veterinary Microbiology* 127, 353-359.
- Song Y.L., Fryer J.L. and Rohovec J.S. (1988). Comparison of gliding bacteria isolated from fish in North American and other areas of Pacific Rim. *Fish Pathology* 23, 197-202.
- Sugimoto N., Kashiwagi W. and Matsuda T. (1981). Pathogenic relation between columnaris disease in cultured eel and the formula feeds. *Bulletin of the Japanese Society for the Science of Fish* 47, 716-725.
- Suomalainen L.-R., Tirola M.A. and Valtonen E.T. (2005a). Influence of rearing conditions on *Flavobacterium columnare* infection of rainbow trout, *Oncorhynchus mykiss* (Walbaum). *Journal of Fish Diseases* 28, 271-277.
- Suomalainen L.-R., Tirola M.A. and Valtonen E.T. (2005b). Treatment of columnaris disease of rainbow trout: low pH and salt as possible tools? *Diseases of Aquatic Organisms* 65, 115-120.
- Suomalainen L.-R., Tirola M.A. and Valtonen E.T. (2005c). Effect of *Pseudomonas* sp. MT5 baths on *Flavobacterium columnare* infection of rainbow trout and on microbial diversity on fish skin and gills. *Diseases of Aquatic Organisms* 63, 61-68.
- Suomalainen L.-R., Tirola M.A. and Valtonen E.T. (2006). Chondroitin AC lyase activity is related to virulence of fish pathogenic *Flavobacterium columnare*. *Journal of Fish Diseases* 29, 757-763.
- Teska J.D. (1993). Assay to evaluate the reaction kinetics of chondroitin AC lyase produced by *Cytophaga columnaris*. *Journal of Aquatic Animal Health* 5, 259-264.
- Thomas-Jinu S. and Goodwin A.E. (2004). Acute columnaris infection in channel catfish, *Ictalurus punctatus* (Rafinesque): efficacy of practical treatments for warmwater aquaculture ponds. *Journal of Fish Diseases* 27, 23-28.
- Tien N.T., Dung T.T., Tuan N.A. and Crumlish M. (2012). First identification of *Flavobacterium columnare* infection in farmed freshwater striped catfish *Pangasianodon hypophthalmus*. *Diseases of Aquatic Organisms* 100, 83-88.
- Toyama T., Kita-Tsukamoto K. and Wakabayashi H. (1996). Identification of *Flexibacter maritimus*, *Flavobacterium branchiophilum* and *Cytophaga columnaris* by PCR targeted 16S ribosomal DNA. *Fish Pathology* 31, 25-31.
- Triyanto A.K. and Wakabayashi H. (1999a). Genotypic diversity of strains of *Flavobacterium columnare* from diseased fishes. *Fish Pathology* 34, 65-71.
- Triyanto A.K. and Wakabayashi H. (1999b). The use of PCR targeted 16S rDNA for identification of genomovars of *Flavobacterium columnare*. *Fish Pathology* 34, 217-218.
- Wakabayashi H. and Egusa S. (1966). Characteristics of a myxobacterium, *Chondrococcus columnuris*, isolated from diseased loach. *Bulletin of the Japanese Society for the Science of Fish* 32, 1015-1022.
- Wakabayashi H., Kira K. and Egusa S. (1970). Studies on columnaris disease of pond-cultured eel -I. Characteristics and pathogenicity of *Chondrococcus columnaris* isolated from pond-cultured eel. *Bulletin of the Japanese Society for the Science of Fish* 36, 147-155.
- Wakabayashi H. and Egusa S. (1972). Preliminary experiments on environmental factors influencing the prevalence of columnaris disease. *Fish Pathology* 7, 58-63.
- Welker T.L., Shoemaker C.A., Arias C.R. and Klesius P.H. (2005). Transmission and detection of *Flavobacterium columnare* in channel catfish *Ictalurus punctatus*. *Diseases of Aquatic Organisms* 63, 129-138.
- Wobeser G. and Atton F.M. (1973). An outbreak of columnaris disease in white suckers (*Catostomus commersoni*) in Saskatchewan. *Journal of the Fisheries Research Board of Canada* 30, 681-683.
- Wood J.W. (1979). Disease of Pacific Salmon; Their Prevention and Treatment (3rd edition). State of Washington, Department of Fisheries, Hatchery Division. 80pp.

Zhang Y., Arias C.R., Shoemaker C.A. and Klesius P.H. (2006). Comparison of lipopolysaccharide and protein profiles between *Flavobacterium columnare* strains from different genomovars. *Journal of Fish Diseases* 29, 657-663.

Bibliography (Section 5. Bacterial Cold-Water Disease)

- Aikawa H. (1998). Indirect immunoperoxidase technique for the diagnosis of cold-water disease in cultured dayu, *Plecoglossus altivelis*. *Fish Pathology* 33, 149-50.
- Altinok I. (2011). Multiplex PCR assay for detection of four major bacterial pathogens causing rainbow trout disease. *Diseases of Aquatic Organisms* 93, 199-206.
- Álvarez B. and Guijarro J.A. (2007). Recovery of *Flavobacterium psychrophilum* viable cells using a charcoal-based medium. *Letters in Applied Microbiology* 44, 569-72.
- Álvarez B., Álvarez J., Menéndez A. and Guijarro J.A. (2008). A mutant in one of two exbD loci of a TonB system in *Flavobacterium psychrophilum* shows attenuated virulence and confers protection against cold water disease. *Microbiology* 154, 1144-1151.
- Amita K., Hoshino A., Honma T. and Wakabayashi H. (2000). An investigation on the distribution of *Flavobacterium psychrophilum* in the Umiwaka River. *Fish Pathology* 35, 193-197.
- Anacker R.L. and Ordal E.J. (1959). Studies on the myxobacterium *Chondrococcus columnaris*. I. Serological typing. *Journal of Bacteriology* 78, 25-32.
- Bader J.A. and Shotts E.B. (1998). Identification of *Flavobacterium* and *Flexibacter* species by species specific polymerase chain reaction to the 16S ribosomal RNA gene. *Journal of Aquatic Animal Health* 10, 311-319.
- Baliarda A., Faure D. and Urdaci M.C. (2002). Development and application of a nested PCR to monitor brood stock salmonid ovarian fluid and spleen for detection of the fish pathogen *Flavobacterium psychrophilum*. *Journal of Applied Microbiology* 92, 510-516.
- Barnes M.E. and Brown M.L. (2011). A Review of *Flavobacterium psychrophilum* biology, clinical signs, and bacterial cold water disease prevention and treatment. *Open Fish Science Journal* 4, 1-9.
- Bernardet J.F., Baudin-Laurencin F. and Tixerant G. (1988). First identification of "Cytophaga psychrophila" in France. European Association of Fish Pathologists 8, 104-105.
- Bernardet J.F. and Kerouault B. (1989). Phenotypic and genomic studies of *Cytophaga psychrophila* isolated from diseased rainbow trout *Oncorhynchus mykiss* in France. *Applied and Environmental Microbiology* 55, 1796-1800.
- Bertolini J.M., Wakabayashi H., Watral V.G., Whipple M.J. and Rohovec J.S. (1994). Electrophoretic detection of proteases from selected strains of *Flexibacter psychrophilus* and assessment of their variability. *Journal of Aquatic Animal Health* 6, 224-223.
- Borg A.F. (1960). *Studies on myxobacteria associated with diseases in salmonid fishes*. American Association for the Advancement of Science, Wildlife Disease. Washington, DC. 8, 1-85.
- Brown L.L., Cox W.T. and Levine R.P. (1997). Evidence that the causal agent of bacterial cold-water disease *Flavobacterium psychrophilum* is transmitted within salmonid eggs. *Diseases of Aquatic Organisms* 29, 213-218.
- Bruun M.S., Schmidt A.S., Madsen I. and Dalsgaard I. (2000). Antimicrobial resistance patterns in Danish isolates of *Flavobacterium psychrophilum*. *Aquaculture* 187, 201-212.
- Bullock G.L. (1972). Studies on selected Myxobacteria pathogenic for fishes and on Bacterial Gill Disease in hatchery-reared salmonids. Technical Papers of the Bureau of Sports Fisheries and Wildlife 60. U.S. Department of the Interior, Fish and Wildlife Service. Washington, D.C. 30 pp.
- Bustos P., Calbuyahue A., Maontaña J., Opazo B., Entrala P. and Solervicens R (1995). First isolation of *Flavobacterium psychrophilum* as causative agent of rainbow trout fry syndrome (RTFS) in Chile. *Bulletin of the European Association of Fish Pathologists* 15, 162-164.
- Cepeda C. and Santos Y. (2000). Rapid and low-level toxic PCR-based method for routine identification of *Flavobacterium psychrophilum*. *International Microbiology* 3, 235-238.

- Cepeda C., García-Márquez S. and Santos Y. (2004). Improved growth of *Flavobacterium psychrophilum* using a new culture medium. *Aquaculture* 238, 75-82.
- Cipriano R.C. (2005). Intraovum infection caused by *Flavobacterium psychrophilum* among eggs from captive Atlantic salmon broodfish. *Journal of Aquatic Animal Health* 17, 275-283.
- Cipriano R.C. and R.A. Holt R.A. (2005). *Flavobacterium psychrophilum*, cause of bacterial cold-water disease and rainbow trout fry syndrome. United States Department of Interior, U.S. Geological Service, National Fish Health Research Laboratory. Fish Disease Leaflet No. 86.
- Conrad J.F. and DeCew M. (1967). Observations on deformed juvenile coho salmon. Fish. Commission of Oregon Briefs 13, 129.
- Crumlish M., Diab A.M. and Ferguson H.W. (2007). Detection of the bacterium *Flavobacterium psychrophilum* from a natural infection in rainbow trout, *Oncorhynchus mykiss* (Walbaum), using formalin-fixed, waxembedded fish tissues. *Journal of Fish Diseases* 30, 37-41.
- Dalsgaard I. (1993). Virulence mechanisms in *Cytophaga psychrophila* and other Cytophaga-like bacteria pathogenic for fish. *Annual Review of Fish Diseases* 3, 127-144.
- Daskalov H., Austin D.A. and Austin B. (1999). An improved growth medium for *Flavobacterium psychrophilum*. *Letters in Applied Microbiology* 28, 297-299.
- Davis H.S. (1946). *Care and diseases of trout*. United States Fish and Wildlife Service Research Report 12. Washington, DC. 98 pp.
- del Cerro A., Mendoza M.C. and Guijarro J.A. (2002a). Simultaneous detection of *Aeromonas salmonicida*, *Flavobacterium psychrophilum*, and *Yersinia ruckeri*, three major fish pathogens, by multiplex PCR. *Applied and Environmental Microbiology* 68, 5177-5180.
- del Cerro A., Mendoza M.C. and Guijarro J.A. (2002b). Usefulness of a Taqman-based polymerase chain reaction assay for the detection of the fish pathogen *Flavobacterium psychrophilum*. *Journal of Applied Microbiology* 93, 149-156.
- del Cerro A., Marquez I. and Prieto J.M. (2010). Genetic diversity and antimicrobial resistance of *Flavobacterium psychrophilum* isolated from cultured rainbow trout, *Oncorhynchus mykiss* (Walbaum), in Spain. *Journal of Fish Diseases* 33, 285-291.
- Duchaud E., Boussaha M., Loux V., Bernardet J.-F., Michel C. and Kerouault B. (2007). Complete genome sequence of the fish pathogen *Flavobacterium psychrophilum*. *Nature Biotechnology* 25, 763-769.
- Evensen Ø. and Lorenzen E. (1996). An immunohistochemical study of *Flexibacter psychrophilus* infection in experimentally and naturally infected rainbow trout (*Oncorhynchus mykiss*) fry. *Diseases of Aquatic Organisms* 25, 53-61.
- Evensen Ø. and Lorenzen E. (1997). Simultaneous demonstration of infectious pancreatic necrosis virus (IPNV) and *Flavobacterium psychrophilum* in paraffin-embedded specimens of rainbow trout *Oncorhynchus mykiss* fry by use of paired immunohistochemistry. *Diseases of Aquatic Organisms* 29, 227-232.
- Gliniewicz K., Plant K.P., LaPatra S.E., LaFrentz B.R., Cain K., Snekvik K.R. and Call D.R. (2012). Comparative proteomic analysis of virulent and rifampicin- attenuated *Flavobacterium psychrophilum*. *Journal of Fish Diseases* 35, 529-539.
- Hadidi S., Glenney G.W., Welch T.J., Silverstein J.T., Wiens G.D. (2008). Spleen size predicts resistance of rainbow trout to *Flavobacterium psychrophilum* challenge. *Journal of Immunology* 180, 4156-4165.
- Henriquez-Nunez H., Evrard O., Kronvall G. and Avendano-Herrera R. (2012). Antimicrobial susceptibility and plasmid profiles of *Flavobacterium psychrophilum* strains isolated in Chile. *Aquaculture* 354, 38-44.
- Henryon M., Berg P., Olesen N.J., Kjaer T.E., Slierendrech W.J., Jokumsen A. and Lund I. (2005). Selective breeding provides an approach to increase resistance of rainbow trout (*Oncorhynchus mykiss*) to the diseases, enteric redmouth disease, rainbow trout fry syndrome, and viral haemorrhagic septicaemia. *Aquaculture* 250, 621-36.
- Holt R.A., Rohovec J.S. and Fryer J.L. (1993). Bacterial cold-water disease. In: *Bacterial Diseases of Fish*, pp.3-22, Inglis V., Roberts R.J. and Bromage N.R. (eds.), Blackwell Scientific Publications, Oxford, UK.

- Iida Y. and Mizokami A. (1996). Outbreaks of coldwater disease in wild ayu and pale chub. *Fish Pathology* 31, 157-164.
- Izumi S. and Wakabayashi H. (1997). Use of PCR to detect *Cytophaga psychrophila* from apparently healthy juvenile ayu and coho salmon eggs. *Fish Pathology* 32, 169-173.
- Izumi S. and Wakabayashi H. (1999). Further study on the serotyping of *Flavobacterium psychrophilum*. *Fish Pathology* 34, 89-90.
- Izumi S., Liu H., Aranishi F. and Wakabayashi H. (2003). A novel serotype of *Flavobacterium psychrophilum* detected using antiserum against an isolate from amago, *Oncorhynchus masou masou* Jordan & Gilbert, in Japan. *Journal of Fish Diseases* 26, 677-80.
- Izumi S. and Wakabayashi H. (2005). Use of PCR to detect *Cytophaga psychrophila* from apparently healthy juvenile ayu and coho salmon eggs. *Fish Pathology* 32, 169-173.
- Kent M.L., Groff J.M., Morrison J.K., Yasutake W.T. and Holt R.A. (1989). Spiral swimming behavior due to cranial and vertebral lesions associated with *Cytophaga psychrophila* infections in salmonid fishes. *Diseases of Aquatic Organisms* 6, 11-16.
- Kondo M.K., Kawai K., Okabe M., Nakano N. and Oshima S. (2003). Efficacy of oral vaccine against bacterial coldwater disease in ayu *Plecoglossus altivelis*. *Diseases of Aquatic Organisms* 6, 11-16.
- Kum C., Kirkan S., Sekkin S., Akar F., Boyacioglu M. (2008). Comparison of *in vitro* antimicrobial susceptibility in *Flavobacterium psychrophilum* isolated from rainbow trout fry. *Journal of Aquatic Animal Health* 20, 245-251.
- Kumagai A., Yamaoka S., Takahashi K., Fukuda H. and Wakabayashi H. (2000). Waterborne transmission of *Flavobacterium psychrophilum* in coho salmon eggs. *Fish Pathology* 35, 25-28.
- LaFrentz B.R. and Cain K.D. (2004). *Bacterial coldwater disease*. Department of Fish and Wildlife Resources and the Aquaculture Research Institute. University of Idaho, Moscow.
- LaFrentz B.R., LaPatra S.E., Jones G.R., Congleton J.L., Sun B. and Cain K.D. (2002). Characterization of serum and mucosal antibody responses and relative per cent survival in rainbow trout, *Oncorhynchus mykiss* (Walbaum), following immunization and challenge with *Flavobacterium psychrophilum*. *Journal of Fish Diseases* 25, 703-713.
- LaFrentz B.R., LaPatra S.E., Call D.R., Wiens G.D. and Cain K.D. (2011). Identification of immunogenic proteins within distinct molecular mass fractions of *Flavobacterium psychrophilum*. *Journal of Fish Diseases* 34, 823-830.
- LaFrentz B.R., LaPatra S.E., Call D.R. and Cain K.D. (2008). Isolation of rifampicin resistant *Flavobacterium psychrophilum* strains and their potential as live attenuated vaccine candidates. *Vaccine* 26, 5582-5589.
- Lapatra S.E., LaFrentz B.R. and Towner R.H. (2012). Selective breeding of food sized rainbow trout against Flavobacteriosis. In: Proceedings of the 3rd International Conference on the Members of the Genus *Flavobacterium*. June 5-7, 2012, Turku, Finland.
- Lee K.B. and Heo G.J. (1998). First isolation and identification of *Cytophaga psychrophila* from culturedayu in Korea. *Fish Pathology* 33, 37-38.
- Lehmann J., Mock D., Stuerenberg F.J. and Bernardet J.F. (1991). First isolation of *Cytophaga psychrophila* from a systemic disease in eel and cyprinids. *Diseases of Aquatic Organisms* 10, 217-220.
- Lindstrom N.M., Call D.R., House M.L., Moffitt C.M. and Cain K.D. (2009). A quantitative enzyme-linked immunosorbent assay and filtrationbased fluorescent antibody test as potential tools to screen broodstock for infection with *Flavobacterium psychrophilum*. *Journal of Aquatic Animal Health* 21, 43-56.
- Liu H., Izumi S. and Wakabayashi H. (2001). Detection of *Flavobacterium psychrophilum* in various organs of ayu *Plecoglossus altivelis* by *in situ* hybridization. *Fish Pathology* 36, 7-11.
- Long A., Polinski M.P., Call D.R. and Cain K.D. (2012). Validation of diagnostic assays to screen broodstock for *Flavobacterium psychrophilum* infections. *Journal of Fish Diseases* 35, 407-419.
- Lorenzen E. (1993) The importance of the brand of the beef extract in relation to the growth of *Flexibacter*

psychrophilus in Anacker & Ordals medium. *Bulletin of the European Association of Fish Pathologists* 13, 64-65.

Lorenzen E. and Karas N. (1992). Detection of *Flexibacter psychrophilus* by immunofluorescence in fish suffering from fry mortality syndrome: A rapid diagnostic method. *Diseases of Aquatic Organisms* 13, 231-234.

Lorenzen E. and Olesen N.J. (1997). Characterization of isolates of *Flavobacterium psychrophilum* associated with coldwater disease or rainbow trout fry syndrome II: Serological studies. *Diseases of Aquatic Organisms* 31, 209-208.

Lorenzen E., Dalsgaard I., From J., Hansen F.M., Horlyck V., Korsholm H., Mellergaard S. and Olesen N.J. (1991). Preliminary investigations of fry mortality syndrome in rainbow trout. *Bulletin of the European Association of Fish Pathologists* 11, 77-79.

Lumsden J.S., Ostland V.E. and Ferguson H.W. (1996). Necrotic myositis in cage cultured rainbow trout, *Oncorhynchus mykiss* (Walbaum), caused by *Flexibacter psychrophilus*. *Journal of Fish Diseases* 19, 113-119.

Lumsden J.S., Young K., Welsh K., MacInnes J., Russell S. and Hesami S. (2006). Management approaches for coldwater disease caused by *Flavobacterium psychrophilum*. In: Proceedings of the Canadian Freshwater Aquaculture Symposium—Aquaculture Canada 2004. St. Andrews, New Brunswick; Aquaculture Association of Canada Special Publication No. 11, 111-117.

Madetoja J., Hänninen M-N., Hirvelä-Koski V., Dalsgaard I. and Wiklund T. (2001). Phenotypic and genotypic characterization of *Flavobacterium psychrophilum* from Finnish fish farms. *Journal of Fish Diseases* 24, 469-479.

Madetoja J., Lonnstrom L.-G., Bjorkbolom C., Ulukoy G., Bylund G., Syvertsen C., Gravningen K., Norderhus E.-A. and Wiklund T. (2006). Efficacy of injection vaccines against *Flavobacterium psychrophilum* in rainbow trout, *Oncorhynchus mykiss* (Walbaum). *Journal of Fish Diseases* 29, 9-20.

Madsen L. and Dalsgaard I. (1999). Vertebral column deformities in farmed rainbow trout (*Oncorhynchus mykiss*). *Aquaculture* 171, 41-48.

Madsen L. and Dalsgaard I. (2000). Comparative studies of Danish *Flavobacterium psychrophilum* isolates: Ribotypes, plasmid profiles, serotypes, and virulence. *Journal of Fish Diseases* 23, 211-218.

Madsen L., Arnbjerg J. and Dalsgaard I. (2001). Radiological examination of the spinal column in farmed rainbow trout *Oncorhynchus mykiss* (Walbaum: experiments with *Flavobacterium psychrophilum* and oxytetracycline. *Aquaculture Research* 32, 235-241.

Mata M. and Santos Y. (2001). An improved enzyme-linked immunosorbent assay (ELISA) for detection of *Flavobacterium psychrophilum* isolated from salmon and rainbow trout. *Bulletin of the European Association of Fish Pathologists* 21, 195-199.

Mata M., Skarmeta A. and Santos Y. (2002). A proposed serotyping system for *Flavobacterium psychrophilum*. *Letters in Applied Microbiology* 35, 166-170.

Michel C., Antonio D. and Hedrick R.P. (1999). Production of viable cultures of *Flavobacterium psychrophilum*: approach and control. *Research in Microbiology* 150, 351-358.

Nagai T., Tamura T., Iida Y. and Yoneji T. (2004). Differences in susceptibility to *Flavobacterium psychrophilum* among three stocks of ayu *Plecoglossus altivelis*. *Fish Pathology* 39, 159-164.

Nagai T. and Nakai T. (2011). Growth of *Flavobacterium psychrophilum* in fish serum correlates with pathogenicity. *Journal of Fish Diseases* 34, 303-310.

Nematollahi A., Decostere A., Pasmans F. and Haesebrouck F. (2003a). *Flavobacterium psychrophilum* infections in salmonid fish. *Journal of Fish Diseases* 26, 563-574.

Nematollahi A., Decostere A., Pasmans F., Ductaelle R. and F. Haesebrouck F. (2003b). Adhesion of high and low virulence *Flavobacterium psychrophilum* strains to isolated gill arches of rainbow trout *Oncorhynchus mykiss*. *Diseases of Aquatic Organisms* 55, 101-107.

Nematollahi A., Pasmans F., Haesebrouck F. and Decostere A. (2005). Early interactions of *Flavobacterium psychrophilum* with macropahges of rainbow trout *Oncorhynchus mykiss*. *Diseases of*

Aquatic Organisms 64, 23-28.

Nicolas P., Mondot S., Achaz G., Bouchenot C., Bernardet J.-F. and Duchaud E. (2008). Population structure of the fish-pathogenic bacterium *Flavobacterium psychrophilum*. *Applied and Environmental Microbiology* 74, 3702-3709.

Nilsson W.B. and Strom M.S. (2002). Detection and identification of bacterial pathogens of fish in kidney tissue using terminal restriction fragment length polymorphism (T-RFLP) analysis of 16S rRNA genes. *Diseases of Aquatic Organisms* 48, 175-185.

Obach A. and Baudin-Laurencin F. (1991). Vaccination of rainbow trout *Oncorhynchus mykiss* against the visceral form of coldwater disease. *Diseases of Aquatic Organisms* 12, 13-15.

Oriux N., Bourdineaud J.-P., Douet D.-G., Daniel P. and Le Henaff M. (2011). Quantification of *Flavobacterium psychrophilum* in rainbow trout, *Oncorhynchus mykiss* (Walbaum), tissues by qPCR. *Journal of Fish Diseases* 34, 811-821.

Ostland V.E., Byrne P.J., Hoover G. and Ferguson H.W. (2000). Necrotic myositis of rainbow trout, *Oncorhynchus mykiss* (Walbaum): proteolytic characteristics of a crude extracellular preparation from *Flavobacterium psychrophilum*. *Journal of Fish Diseases* 23, 329-336.

Pacha R.E. (1968). Characteristics of *Cytophaga psychrophila* (Borg) isolated during outbreaks of bacterial cold-water disease. *Applied Microbiology* 16, 97-101.

Pacha R.E. and Porter S. (1968). Characteristics of myxobacteria isolated from the surface of freshwater fish. *Applied Microbiology* 16, 1901-1906.

Plant K.P., LaPatra S.E. and Cain K.D. (2009). Vaccination of rainbow trout, *Oncorhynchus mykiss* (Walbaum), with recombinant DNA vaccines produced to *Flavobacterium psychrophilum* heatshock proteins 60 and 70. *Journal of Fish Diseases* 32, 521-534.

Rahman M.H., Otake M., Iida Y., Yokomizu Y. and Nakanishi T. (2000). Efficacy of oil-adjuvanted vaccine for coldwater disease in ayu *Plecoglossus altivelis*. *Fish Pathology* 35, 199-203.

Rahman M.H., Kuroda A., Dijkstra J.M., Kiryu I., Nakanishi T. and Otake M. (2002). The outer membrane fraction of *Flavobacterium psychrophilum* induces protective immunity in rainbow trout and ayu. *Fish and Shellfish Immunology* 12, 169-179.

Rangdale R.E. and Way K. (1995). Rapid identification of *C. psychrophila* from infected spleen tissue using an enzyme-linked immunosorbent assay (ELISA). *Bulletin of the European Association of Fish Pathologists* 15, 213-216.

Rangdale R.E., Richards R.H. and Alderman D.J. (1997). Colonisation of eyed rainbow trout ova with *Flavobacterium psychrophilum* leads to Rainbow Trout Fry Syndrome in fry. *Bulletin of the European Association of Fish Pathologists* 17, 108-111.

Santos B.Y., Huntly P.J., Turnbull A. and Hastings T.S. (1992). Isolation of *Cytophaga psychrophila* (*Flexibacter psychrophilus*) in association with rainbow trout mortality in the United Kingdom. *Bulletin of the European Association of Fish Pathologists* 12, 209-210.

Schmidtke I.M. and Carson J. (1995). Characteristics of *Flexibacter psychrophilus* isolated from Atlantic salmon in Australia. *Diseases of Aquatic Organisms* 21, 157-161.

Secades P., Alvarez B. and Guijarro J.A. (2001). Purification and characterization of a psychrophilic, calcium-induced, growth-phase-dependent, metalloprotease from the fish pathogen, *Flavobacterium psychrophilum*. *Applied and Environmental Microbiology* 676, 2436-2444.

Silverstein J.T., Vallejo R.L., Palti Y., Leeds T.D., RexroadIII C.E., Welch T.J., Wiens G.D. and Ducrocq V. (2009). Rainbow trout resistance to bacterial cold-water disease is moderately heritable and is not adversely correlated with growth. *Journal of Animal Science* 87, 860-867.

Soule M., LaFrentz S., Cain K., LaPatra S., Call D.R. (2005). Polymorphisms in 16S rRNA genes of *Flavobacterium psychrophilum* correlate with elastin hydrolysis and tetracycline resistance. *Diseases of Aquatic Organisms* 65, 209-216.

Starliper C.E. (2011). Bacterial coldwater disease of fishes caused by *Flavobacterium psychrophilum*. *Journal of Advanced Research* 2, 97-108.

Suzuki K., Arai H., Kuge T., Katagiri T. and Izumi S. (2008). Reliability of PCR methods for the detection of *Flavobacterium psychrophilum*. *Fish Pathology* 43, 124-127.

Taylor P.W. (2004). Detection of *Flavobacterium psychrophilum* in eggs and sexual fluids of pacific salmonids by a polymerase chain reaction assay: Implications for vertical transmission of bacterial coldwater disease. *Journal of Aquatic Animal Health* 16, 104-108.

Taylor P.W. and Winton J.R. (2002). Optimization of nested polymerase chain reaction assays for identification of *Aeromonas salmonicida*, *Yersinia ruckeri*, and *Flavobacterium psychrophilum*. *Journal of Aquatic Animal Health* 14, 216-224.

Toranzo A.E. and Barja J.L. (1993). Fry mortality syndrome (FMS) in Spain, isolation of the causative bacterium *Flexibacter psychrophilus*. *Bulletin of the European Association of Fish Pathologists* 13, 30-32.

Toyama T., Kita-Tsukamoto K. and Wakabayashi H. (1994). Identification of *Cytophaga psychrophila* by PCR targeted 16S ribosomal RNA. *Fish Pathology* 29, 271-275.

Urdaci M.C., Chakroun C., Faure D. and Bernardet J.F. (1998). Development of a polymerase chain reaction assay for identification and detection of the fish pathogen *Flavobacterium psychrophilum*. *Research in Microbiology* 149, 519-530.

Vastos I.N., Thompson K.D. and Adams A. (2002). Development of an indirect immunofluorescent antibody technique (IFAT) and *in situ* hybridization to detect *Flavobacterium psychrophilum* in water samples. *Aquaculture Research* 33, 1087-1090.

Wakabayashi H. (2009). Epizootic outbreaks of bacterial cold water disease among populations of river ayu, *Plecoglossus altivelis*, in Japan – a review. In: Proceedings of the 2nd International Conference on the Members of the Genus *Flavobacterium*, September 21-23, 2009, Paris, France.

Wakabayashi H., Toyama T. and Iida T. (1994). A study on serotyping of *Cytophaga psychrophila* isolated from fishes in Japan. *Fish Pathology* 29, 101-104.

Wakabayashi H., Horiuchi M., Bunya T. and Hoshiai G. (1991). Outbreaks of cold-water disease in coho salmon in Japan. *Fish Pathology* 26, 211-212.

Weis J. (1987). A cold water disease in rainbow trout. Ueber das Vorkommen einer Kaltwasserkrankheit bei Regenbogenforellen *Salmo gairdneri*. *Tierarztliche Umschau* 42, 575-578.

Wiklund T., Kaas K., Lönström L. and Dalsgaard I. (1994). Isolation of *Cytophaga psychrophila* (*Flexibacter psychrophilus*) from wild and farmed rainbow trout (*Oncorhynchus mykiss*) in Finland. *Bulletin of the European Association of Fish Pathologists* 14, 44-46.

Wiklund T., Madsen L., Bruun M.S. and Dalsgaard I. (2000). Detection of *Flavobacterium psychrophilum* from fish tissue and water samples by PCR amplification. *Journal of Applied Microbiology* 88, 299-307.

Wood J.W. (1979). Diseases of Pacific salmon, their prevention and treatment, 3rd edition. Washington Department of Fisheries, Olympia, Washington.

Yoshiura Y., Kamaishi T., Nakayashu C. and Ototake M. (2006). Detection and genotyping of *Flavobacterium psychrophilum* by PCR targeted to peptidyl-prolyl cis-trans isomerase C gene. *Fish Pathology* 41, 67-71.

Bibliography (Section 6. Red Spot Disease)

Wakabayashi H. and Egusa S. (1972). Characteristics of a *Pseudomonas* sp. from an epizootic of pond-cultured eels (*Anguilla japonica*). *Bulletin of the Japanese Society of Scientific Fisheries* 38, 577-587.

Muroga K. (1978). Red spot disease of eels. *Fish Pathology* 13, 35-39.

Miyazaki T. and Egusa S. (1977). Histopathological studies of red spot disease of the Japanese eel (*A. japonica*)-I. Natural infection. *Fish Pathology* 12, 39-49.

Kuo S.-C. and Kou G.-H. (1978). *Pseudomonas anguilliseptica* isolated from red spot disease of pond-cultured eel, *Anguilla japonica*. Report of the Institute of Fish Biology, Ministry of Economic Affairs, and National Taiwan University, Vol. 3. The Institute of Fishery Biology, National Taiwan University, Taipei, Taipei China, 19-23.

- Jo Y., Muroga K. and Ohnishi K. (1975). Studies on red spot disease of pond-cultured eels. III. A case of the disease in the European eels (*Anguilla anguilla*) cultured in Tokushima Prefecture. *Fish Pathology* 9, 115-118.
- Stewart D.J., Woldemariam K., Dear G. and Mochaba F.M. (1983). An outbreak of ' Sekiten-byo' among cultured European eels, *Anguilla anguilla* L., in Scotland. *Journal of Fish Diseases* 6, 75-76.
- Mellergaard S. and Dalsgaard I. (1987). "Disease problems in Danish eel farms". *Aquaculture* 67, 139-146.
- Michel C., Bernardet J.-F. and Dinand D. (1992). Phenotypic and genotypic studies of *Pseudomonas anguilliseptica* strains isolated from farmed European eels (*Anguilla Anguilla*) in France. *Fish Pathology* 27, 229-232.
- Haenen O.L.M. and Davidse A. (2001). First isolation and pathogenicity studies with *Pseudomonas anguilliseptica* from diseases European eel *Anguilla anguilla* (L.) in the Netherlands. *Aquaculture* 196, 27-36.
- Nakajima K., Muroga K. and Hancock R.W. (1983). Comparison of fatty acid, protein and serological properties distinguishing outer membrane of *Pseudomonas anguilliseptica* strains from those of fish pathogens and other pseudomonads. *International Journal of Systematic Bacteriology* 33, 1-8.
- Kusuda R., Dohata N., Fukuda Y. and Kawai K. (1995). *Pseudomonas anguilliseptica* infection of striped Jack. *Fish Pathology* 30, 121-122.
- Ferguson H.W., Collins R.O., Moore M., Coles M. and MacPhee D.D. (2004). *Pseudomonas anguilliseptica* infection in farmed cod, *Gadus morhua* L. *Journal of Fish Diseases* 27, 249-253.
- Balboa S., Ferguson H.W. and Romalde J.L. (2007). Phenotypic, serological and genetic characterization of *Pseudomonas anguilliseptica* strains isolated from cod, *Gadus morhua* L., in northern Europe. *Journal of Fish Diseases* 30, 657-664.
- Al-Marzouk A.E. (1999). Association of *Pseudomonas anguilliseptica* with mortalities in cultured marine orange-spotted grouper *Epinephelus coioides* in Kuwait. *Fish Pathology* 34, 167-168.
- Berthe F.C.J., Michel C. and Bernardet J.-F. (1995). Identification of *Pseudomonas anguilliseptica* isolated from several fish species in France. *Diseases of Aquatic Organisms* 21, 151-155.
- Domenech A., Fernandez-Garayzabal J.F., Lawson P., Garcia J.A., Cutuli M.T., Blanco M., Gibello A., Moreno M.A., Collins M.D. and Dominguez L. (1997). Winter disease outbreak in sea bream (*Sparus aurata*) associated with *Pseudomonas anguilliseptica* infection. *Aquaculture* 156, 317-326.
- Lopez-Romalde S., Nunez S., Tranzo A.E. and Romalde J.L. (2003). Black spot seabream (*Pagellus bogaraveo*), a new susceptible host for *Pseudomonas anguilliseptica*. *Bulletin of the European Association of Fish Pathologists* 23 258-264.
- Wiklund T. and Bylund G. (1990). *Pseudomonas anguilliseptica* as a pathogen of salmonid fish in Finland. *Diseases of Aquatic Organisms* 8, 13-19.
- Wiklund T. and Lonnstrom L. (1994). Occurrence of *Pseudomonas anguilliseptica* in Finnish fish farms during 1986–1991. *Aquaculture* 126, 211-217.
- Nakai T., Hanada H. and Muroga K. (1985). First records of *Pseudomonas anguilliseptica* infection in cultured ayu, *Plecoglossus altivelis*. *Fish Pathology* 20, 481-484.
- Lonnstrom L., Wiklund T. and Bylund G. (1994). *Pseudomonas anguilliseptica* isolated from Baltic herring *Clupea harengus* membras with eye lesions. *Diseases of Aquatic Organisms* 18, 143-147.
- Muroga K., Jo Y. and Yano M. (1973). Studies on red spot disease of pondcultured eels. 1. The occurrence of the disease in eel culture ponds in Tokushima prefecture in 1972. *Fish Pathology* 8, 1-9.
- Tranzo A.E., Magarinos B. and Romalde J.L. (2005). A review of the main bacterial fish diseases in mariculture systems. *Aquaculture* 246, 37-61.
- Muroga K., Nakai T. and Sawada T. (1977). Studies on red spot disease of cultured eels—IV. Physiological characteristics of the causative bacterium *Pseudomonas anguilliseptica*. *Fish Pathology* 12, 33-38.
- Nakai T., Muroga K. and Wakabayashi H. (1981). Serological properties of *Pseudomonas anguilliseptica* in

- agglutination. *Bulletin of the Japanese Society of Scientific Fisheries* 47, 699-703.
- Nakai T., Muroga K. and Wakabayashi H. (1982). An immuno-electrophoretic analysis of *Pseudomonas anguilliseptica*. *Bulletin of the Japanese Society of Scientific Fisheries* 48, 363-367.
- Nakai T. and Muroga K. (1982). *Pseudomonas anguilliseptica* isolated from European eels (*Anguilla anguilla*) in Scotland. *Fish Pathology* 17, 147-150.
- Nakai T., Muroga K., Chung H.-Y. and Kou G.-H. (1985a). A serological study on *Pseudomonas anguilliseptica* isolated from diseased eels in Taiwan. *Fish Pathology* 19, 259-261.
- Nakai T. (1985). Resistance of *Pseudomonas anguilliseptica* to bactericidal action of fish serum. *Bulletin of the Japanese Society of Scientific Fisheries* 51, 1431-1436.
- Lopez-Romalde S., Magarinos B., Nunez S., Toranzo A.E. and Romalde J.L. (2003). Phenotypic and genetic characterization of *Pseudomonas anguilliseptica* strains isolated from fish. *Journal of Aquatic Animal Health* 15, 39-47.
- Muroga K., Jo Y. and Sawada T. (1975). Studies on red spot disease of pond cultured eels. - II. Pathogenicity of the causative bacterium *Pseudomonas anguilliseptica*. *Fish Pathology* 9, 107-114.
- Uno M. (1976). Experimental pathogenicity of *Aeromonas salmonicida*, *Vibrio anguillarum* and *Pseudomonas anguilliseptica* for Iwana and other trout. *Fish Pathology* 11, 5-9.
- Nakai T., Kanemori Y., Nakajima K. and Muroga K. (1985b). The fate of *Pseudomonas anguilliseptica* in artificially infected eels *Anguilla japonica*. *Fish Pathology* 19, 253-258.
- Muroga K. and Nakajima K. (1981). Red spot disease of cultured eels- methods for artificial infection. *Fish Pathology* 15, 315-318.
- Magi G.E., Lopez-Romalde S., Magarinos B., Lamas J., Toranzo A.E. and Romalde J.L. (2009). Experimental *Pseudomonas anguilliseptica* infection in turbot *Psetta maxima* (L.): a histopathological and immuno-histochemical study. *European Journal of Histochemistry* 53, 73-80.
- Horiuchi M. and Kohga K. (1979). Rapid diagnosis of red spot disease in cultured eels by direct immunofluorescence (IF). *Bulletin of the Japanese Society of Scientific Fisheries* 45, 835-840.
- Blanco M.M., Gibello A., Vela A.I., Moreno M.A., Dominguez L. and Fernandez-Garayzabal J.F. (2002). PCR detection and PFGE DNA macrorestriction analyses of clinical isolates of *Pseudomonas anguilliseptica* from winter disease outbreaks in sea bream *Sparus aurata*. *Diseases of Aquatic Organisms* 50, 19-27.
- Romalde J.L., Lopez-Romalde S., Ravelo C., Margarinos B., Toranzo A.E. (2004). Development and validation of a PCR-based protocol for the detection of *Pseudomonas anguilliseptica*. *Fish Pathology* 39, 33-41.
- Beaz-Hidalgo R., Lopez-Romalde S., Toranzo A.E. and Romalde J.L. (2008). Polymerase chain reaction of enterbacterial repetitive intergenic consensus and repetitive extragenic palindromic sequences for molecular typing of *Pseudomonas anguilliseptica* and *Aeromonas salmonicida*. *Journal of Aquatic Animal Health* 20, 75-85.
- Jo Y. (1978). Therapeutic experiments on red spot disease. *Fish Pathology* 13, 41-42.
- Nakai T. and Muroga K. (1979). Studies on red spot disease of pond-cultured eels – V. Immune response of the Japanese eel to the causative bacterium *Pseudomonas anguilliseptica*. *Bulletin of the Japanese Society of Scientific Fisheries* 45, 817-821.
- Nakai T., Muroga K., Ohnishi K., Jo Y. and Tanimoto H. (1982). Studies on the red spot disease of pond cultured eels - IX. A field vaccination trial. *Aquaculture* 30, 131-135.
- Mushiake K., Muroga K. and Nakai T. (1984). Increased susceptibility of Japanese eel *Anguilla japonica* to *Edwardsiella tarda* and *Pseudomonas anguilliseptica* following exposure to copper. *Bulletin of the Japanese Society of Scientific Fisheries* 50, 1797-1801.

Bibliography (Section 7. Edwardsiellosis (*Edwardsiella ictaluri*))

- Hawke, J.P., McWhorter A.C., Steigerwalt A.G. and Brenner D.J. (1981). *Edwardsiella ictaluri* sp. nov.. the causative agent of enteric septicemia of catfish. *International Journal of Systematic Bacteriology* 31, 396-400.
- Ewing W.H., McWhorter A.C., Escobar M.R. and Lubin A.H. (1965). Edwardsiella, a new genus of Enterobacteriaceae based on a new species, *E. tarda*. *International Bulletin of Bacteriological Nomenclature and Taxonomy* 15, 33-38.
- Grimont P.A.D., Grimont F., Richard C. and Sakazaki R. (1980). *Edwardsiella hoshinae*, a new species of Enterobacteriaceae. *Current Microbiology* 4, 347-351.
- Abbott S.L. and Janda J.M. (2006). The genus Edwardsiella. In: *The Prokaryotes, A handbook on the Biology of Bacteria*, 3rd edn., vol. 6., pp.72-89, Dworkin M., Falkow S., Rosenberg E., Schleifer K.H. and Stackebrandt E. (eds.), Springer, New York, NY, USA.
- Evans J.J., Klesius P.H., Plumb J.A. and Shoemaker C.A. (2011). *Edwardsiella* septicaemias. In: *Fish Diseases and Disorders*, volume 3, pp.512-569, Woo P.T.K., and Bruno D.W. (eds.), CABI, Wallingford, UK
- Hawke J.P. (1979). A bacterium associated with disease of pond cultured channel catfish, *Ictalurus punctatus*. *Journal of the Fisheries Research Board of Canada* 36, 1508-1512.
- Plumb J.A. and Vinitnantharat S. (1993). Vaccination of channel catfish, *Ictalurus punctatus*, Rafinesque, by immersion and oral booster against *Edwardsiella ictaluri*. *Journal of Fish Diseases* 16, 65-71.
- Shoemaker C.A., Klesius P.H., Arias C.R. and Evans J.J. (2003). A modified live vaccine against enteric septicaemia in channel catfish. 3rd International Symposium on Fish Vaccinology, April 9-11, 2003, Bergen Norway.
- Ferguson H.W., Turnbull J.F., Shinn A.P., Thompson K., Dung T.T. and Crumlish M. (2001). Bacillary necrosis in farmed *Pangasius hypophthalmus* (Sauvage) in the Mekong Delta, Vietnam. *Journal of Fish Diseases* 24, 509-513.
- Crumlish M., Dung T.T., Turnbull J.F., Ngoc N.T.N. and Ferguson H.W. (2002). Identification of *Edwardsiella ictaluri* from diseased freshwater catfish, *Pangasius hypophthalmus* (Sauvage), cultured in the Mekong Delta, Vietnam. *Journal of Fish Diseases* 25, 733-736.
- Yuasa K., Kholidin E.B., Panigoro N. and Hatai K. (2003). First isolation of *Edwardsiella ictaluri* from cultured striped catfish *Pangasius hypophthalmus* in Indonesia. *Fish Pathology* 38, 181-84.
- Plumb J.A. and Vinitnantharat S. (1989). Biochemical, biophysical, and serological homogeneity of *Edwardsiella ictaluri*. *Journal of Aquatic Animal Health* 1, 51-56.
- Waltman W.D., Shotts E.B. and Hsu T.C. (1986). Biochemical characteristics of *Edwardsiella ictaluri*. *Applied and Environmental Microbiology* 51, 101-104.
- Williams M.L., Gillaspy A.F., Dyer D.W., Thune R.L., Waldbieser G.C., Schuster S.C., Gipson J., Zaitshik J., Landry C., Banes M.M. and Lawrence M.L. (2012). Genome sequence of *Edwardsiella ictaluri* 93-146, a strain associated with a natural channel catfish outbreak of enteric septicemia of catfish. *Journal of Bacteriology* 194, 740-741.
- Plumb J.A. and Klesius P. (1988). An assessment of the antigenic homogeneity of *Edwardsiella ictaluri* using monoclonal antibody. *Journal of Fish Diseases* 11, 499-509.
- Bertolini J.M., Cipriano R.C., Pyle S.W., McLaughlin J.J. (1990). Serological investigation of the fish pathogen *Edwardsiella ictaluri*, cause of enteric septicemia of catfish. *Journal of Wildlife Diseases* 26, 246-252.
- Lobb C.J., Ghaffari S.H., Hayman J.R., Thompson D.T. (1993). Plasmid and serological differences between *Edwardsiella ictaluri* strains. *Applied and Environmental Microbiology* 59, 2830-2836.
- Bader J.A., Shoemaker C.A., Klesius P.H., Connolly M.A. and Barbaree J.M. (1998). Genomic subtyping of *Edwardsiella ictaluri* isolated from diseased channel catfish by arbitrarily primed polymerase chain reaction. *Journal of Aquatic Animal Health* 10, 22-27.

- Klesius P., Lovy J., Evans J., Washuta E. and Arias C. (2003). Isolation of *Edwardsiella ictaluri* from Tadpole Madtom in a Southwestern New Jersey River. *Journal of Aquatic Animal Health* 15, 295-301.
- Sakai T., Yuasa K., Ozaki A., Sano M., Okuda R., Nakai T. and Iida T. (2009). Genotyping of *Edwardsiella ictaluri* isolates in Japan using amplified-fragment length polymorphism analysis. *Letters in Applied Microbiology* 49, 443-449.
- Plumb J.A. and Sanchez D.J. (1983). Susceptibility of five species of fish to *Edwardsiella ictaluri*. *Journal of Fish Diseases* 6, 261-266.
- Sakai T., Kamaishi T., Sano M., Tensha K., Arima T., Iida Y., Nagai T., Nakai T. and Iida T. (2008). Outbreaks of *Edwardsiella ictaluri* infection in ayu. *Plecoglossus altivelis* in Japanese rivers. *Fish Pathology* 43, 152-157.
- Morrison E.E. and Plumb J.A. (1994). Olfactory organ of channel catfish as a site of experimental *Edwardsiella ictaluri* infection. *Journal of Aquatic Animal Health* 6, 101-109.
- Wolfe K.G., Plumb J.A., and Morrison E.E. (1998). Lectin binding characteristics of the olfactory mucosa of channel catfish: Potential factors in attachment of *Edwardsiella ictaluri*. *Journal of Aquatic Animal Health* 10, 348-360.
- Miyazaki T. and Plumb J.A. (1985). Histopathology of *Edwardsiella ictaluri* in channel catfish, *Ictalurus punctatus* (Rafinesque). *Journal of Fish Diseases* 8, 389-392.
- Shotts E.B., Blazer V.S. and Waltman W.D. (1986). Pathogenesis of experimental *Edwardsiella ictaluri* infections in channel catfish (*Ictalurus punctatus*). *Canadian Journal of Fisheries and Aquatic Sciences* 43, 36-42.
- Newton J.C., Wolfe L.G., Grizzle J.M. and Plumb J.A. (1989). Pathology of experimental enteric septicaemia in channel catfish, *Ictalurus punctatus* (Rafinesque), following immersion exposure to *Edwardsiella ictaluri*. *Journal of Fish Diseases* 12, 335-347.
- Nusbaum K.E. and Morrison E.E. (1996). Entry of 35S-labeled *Edwardsiella ictaluri* into channel catfish. *Journal of Aquatic Animal Health* 8, 146-149.
- Austin B. & Austin D.A. (2007). *Bacterial fish pathogens: Disease of farmed and wild fish*. 4th edn. Springer, Chichester, UK.
- Shotts E.B. and Waltman W.D. (1990). A medium for the selective isolation of *Edwardsiella ictaluri*. *The Journal of Wildlife Diseases* 26, 214-218.
- Bullock G.L. and Herman R.L. (1985). Fish Disease Leaflet 71. U.S. Department of the Interior, Fish and Wildlife Service, Division of Fishery Research, Washington.
- Plumb J.A. (1999). *Health Maintenance and Principal Microbial Diseases of Cultured Fishes*, Iowa State University Press, IA, USA.
- Bilodeau A.L., Waldbieser G.C., Terhune J.S., Wise D.J. and Wolters W.R. (2003). A real-time polymerase chain reaction assay of the bacterium *Edwardsiella ictaluri* in channel catfish. *Journal of Aquatic Animal Health* 15, 80-86.
- Sakai T., Yuasa K., Sano M. and Iida T. (2009). Identification of *Edwardsiella ictaluri* and *E. tarda* by species-specific polymerase chain reaction targeted to the upstream region of the fimbrial gene. *Journal of Aquatic Animal Health* 21, 124-132.
- Ainsworth A.J., Capley G., Waterstreet P. and Munson, D. (1986). Use of monoclonal antibodies in the indirect fluorescent antibody technique (IFA) for the diagnosis of *Edwardsiella ictaluri*. *Journal of Fish Diseases* 9, 439-444.
- Waterstrat, P., Ainsworth A.J. and Capley, G. (1989). Use of an indirect enzyme-linked immunosorbent assay (elisa) in the detection of channel catfish, *Ictalurus punctatus* (Rafinesque), antibodies to *Edwardsiella ictaluri*. *Journal of Fish Diseases* 12, 87-94.
- Saeed M.O. and Plumb J.A. (1986). Immune response of channel catfish to lipopolysaccharide and whole cell *Edwardsiella ictaluri* vaccines. *Diseases of Aquatic Organisms* 2, 21-25.
- Vinitnantharat S. and Plumb J.A. (1992). Kinetics of the immune response of channel catfish to

- Edwardsiella ictaluri. *Journal of Aquatic Animal Health* 4, 207-214.
- Vinitnantharat S., Plumb J.A. and Brown A.E. (1993). Isolation and purification of an outer membrane protein of Edwardsiella ictaluri and its antigenicity to channel catfish (*Ictalurus punctatus*). *Fish and Shellfish Immunology* 3, 401-409.
- Thune R.L., Hawke J.P., and Johnson M.C. (1994). Studies on vaccination of channel catfish, *Ictalurus punctatus*, against Edwardsiella ictaluri. *Journal of Applied Aquaculture* 3, 11-24.
- Klesius P.H. and Shoemaker C.A. (1999). Development and use of modified live Edwardsiella ictaluri vaccine against enteric septicemia of catfish. In: *Advances in Veterinary Medicine*, volume 41, pp.523-537, Schultz R.D. (ed.), Academic Press, San Diego, CA, USA.
- Yang M., Lv Y., Xiao J., Wu H., Zheng H., Liu Q., Zhang Y. and Wang Q. (2012). Edwardsiella comparative phylogenomics reveal the new intra/inter-species taxonomic relationships, virulence evolution and niche adaptation mechanisms. *PLoS One*, 7, E36987.
- Thune R.L., Fernandez D.H., Benoit J.L., Kelly-Smith M., Rogge M.L., Booth N.J., Landry C.A. and Bologna R.A. (2007). Signature-tagged mutagenesis of Edwardsiella ictaluri identifies virulence-related genes, including a salmonella pathogenicity island 2 class of type III secretion systems. *Applied and Environmental Microbiology* 73, 7934-7946.
- Wang X., Wang Q., Xiao J., Liu Q., Wu H., Xu L. and Zhang Y. (2009). Edwardsiella tarda T6SS component evpP is regulated by esrB and iron, and plays essential roles in the invasion of fish. *Fish and Shellfish Immunology* 27, 469-477.
- Chakraborty S., Sivaraman J., Leung K.Y. and Mok Y.K. (2011). Two-component PhoB-PhoR regulatory system and ferric uptake regulator sense phosphate and iron to control virulence genes in type III and VI secretion systems of Edwardsiella tarda. *The Journal of Biological Chemistry* 286, 39417-39430.
- Rogge M.L. and Thune R.L. (2011). Regulation of the Edwardsiella ictaluri type III secretion system by pH and phosphate concentration through EsrA, EsrB, and EsrC. *Applied and Environmental Microbiology* 77, 4293-4302.
- Bibliography (Section 8. Motile Aeromonads Disease)**
- Aoki T. and Egusa S. (1971). Drug sensitivity of *Aeromonas liquefaciens* isolated from freshwater fish. *Bulletin of the Japanese Society for the Science of Fish*, 37, 176-185.
- Aoki T. (1974). Studies of drug-resistant bacteria isolated from water of carp-ponds and intestinal tracts of carp. *Bulletin of the Japanese Society for the Science of Fish*, 40, 247-254. (in Japanese).
- Aoki T. (1992). Chemotherapy and drug resistance in fish farms in Japan. In: *Diseases in Asian Aquaculture* Vol. I, pp.519-529, Shariff M., Subasinghe R.P. and Arthur J.R. (eds.), Fish Health Section, Asian Fisheries Society, Manila, Philippines.
- Aoki T. (1999). Motile Aeromonads (*Aeromonas hydrophila*). In: *Fish Diseases and Disorders*, pp.247-253, Woo P.T.K. and Bruno D.W. (eds.), CABI Publishing, USA.
- Arcos M.L., de Vicente A., Moriñigo M.A., Romero P. and Borrego J.J. (1988). Evaluation of several selective media for recovery of *Aeromonas hydrophila* from polluted waters. *Applied and Environmental Microbiology*, 54, 2786-2792.
- Austin B. and Austin D.A. (1987). *Bacterial Fish Pathogens: Disease in Farmed and Wild Fish*. Ellis Horwood, Chichester, UK.
- Bullock G.L. (1966). Precipitins and agglutinin reaction of aeromonads isolated from fish and other sources. *Bulletin - Office International des Epizooties*, 65, 805-824.
- Bullock G.L. and Snieszko S.F. (1971). Bacterial Diseases of fishes. In: *Diseases of Fishes*. Book 2A, pp.21-41, Snieszko S.F. and Axelrod H.R. (eds.), TFH publications, Neptune, NJ, USA.
- Cahill M.M. (1990). Virulence factors in motile Aeromonas species. *Journal of Applied Bacteriology*, 69, 1-16.

- Cascón A., Anguita J., Hernanz C., Sánchez M., Fernandez M. and Naharro G. (1996). Identification of *Aeromonas hydrophila* hybridization group I by PCR analysis. *Applied and Environmental Microbiology*, 62, 1167-1170.
- Cipriano C.C. and Austin B. (2011). Furunculosis and other Aeromonad Diseases. In: *Fish Diseases and Disorders, Viral, Bacterial, and Fungal Infections*, vol. 3., pp.424-483, Woo P.T.K. and Bruno D.W. (eds.), CABI International, Oxfordshire, UK.
- Davis J.W. and Sizemore R.K. (1981). Nonselectivity of Rimler-Shotts Medium for *Aeromonas hydrophila* in Estuarine Environments. *Applied and Environmental Microbiology*, 42, 544-545.
- Dumontet S., Krovacek K., Baloda S.B., Grottoli R., Pasquale V. and Vanucci S. (1996). Ecological relationship between *Aeromonas* and *Vibrio* spp. and planktonic copepods in the coastal marine environment in southern Italy. Comparative Immunology, *Microbiology and Infectious Diseases*, 19, 245-254.
- East A.K. and Collins M.D. (1993). Molecular characterization of DNA encoding 23S rRNA and 16S-23S rRNA intergenic spacer regions of *Aeromonas hydrophila*. *FEMS Microbiology Letters*, 106, 129-133.
- Eddy B.P. (1960). Cephalotrichous, fermentative Gram-negative bacteria: the genus 79 *Aeromonas*. *Journal of Applied Bacteriology*, 23, 216-248.
- Egusa S. (1978). *Infectious diseases of fish*. 554 pp. Kouseisha Kouseikaku, Tokyo. (In Japanese).
- Endo T., Ogishima K., Hayasaki H., Kaneko S. and Oshima S. (1973). Application of oxolinic acid as a chemotherapeutic agent against infectious diseases in fish. *Bulletin of the Japanese Society for the Science of Fish*, 39, 165-171. (in Japanese).
- Fijian N.N. (1972). Infectious dropsy in carp – a disease complex. In: *Diseases of Fish*. Symposia of the Zoological Society of London, No. 30, pp.39-51, Mawdesley L.E. (ed.), Academic Press, London, UK.
- Ford L.A. and Thune R.L. (1992). Immunization of channel catfish with a crude, acid extracted preparation of motile aeromonad S-layer protein. *Biochemical Letters*, 47, 335-362.
- Fukui H., Fujihara Y. and Kano T. (1987). *In vitro* and *in vivo* antibacterial activities of florfenicol, a new fluorinated analog of thiamphenicol, against fish pathogens. *Fish Pathology*, 22, 201-207.
- Gosling P.J. (1996). Pathogenic mechanisms. In: *The genus: Aeromonas*. First edition, pp.245-265, Austin B., Altwegg M., Gosling P.J. and Joseph S.W. (eds.), John Wiley and Sons, Chichester, UK.
- Han J.E., Kim J.H., Choresca C., Shin S.P., Jun J.W. and Park S.C. (2013). Draft Genome Sequence of a Clinical Isolate, *Aeromonas hydrophila* SNUFPC-A8, from a Moribund Cherry Salmon (*Oncorhynchus masou masou*). *Genome Announcements*, 1(1), e00133-12.
- Hazen T.C., Fliermans C.B., Hirsch R.P. and Esch G.W. (1978). Prevalence and distribution of *Aeromonas hydrophila* in the United States. *Applied and Environmental Microbiology*, 36, 731-738.
- Hoshina T. (1962). Studies on Red-fin Disease of Eel. Special Research Report of Tokyo University of Fisheries, 6, 105. (In Japanese).
- Janda J.M., Guthertz L.S., Kokka R.P. and Shimada T. (1994). Aeromonas species in septicemia: laboratory characteristics and clinical observations. *Clinical Infectious Diseases*, 19, 77-83.
- Janda J.M., Abbott S.L., Khashe S., Kellogg G.H., Shimada T. (1996). Further studies on biochemical characteristics and serologic properties of the genus *Aeromonas*. *Journal of Clinical Microbiology*, 34, 1930-1933.
- Karunasagar I., Rosalind G. and Karunasagar I. (1991). Immunological response of the Indian major carps to *Aeromonas hydrophila* vaccine. *Journal of Fish Diseases*, 14, 413-417.
- Kaper J., Seidler R.J., Lockman H. and Colwell R.R. (1979). Medium for the presumptive identification of *Aeromonas hydrophila* and *Enterobacteriaceae*. *Applied and Environmental Microbiology*, 38, 1023-1026.
- Kaper J.B., Lockman H., Colwell R.R. and Joseph S.W. (1981). *Aeromonas hydrophila*: ecology and toxigenicity of isolates from an estuary. The *Journal of Applied Bacteriology*, 50, 359-377.

- Katae H., Kouno Y., Takase Y., Miyazaki H., Hashimoto M. and Shimizu M. (1979). The evaluation of piromidic acid as an antibiotic in fish: an *in vitro* and *in vivo* study. *Journal of Fish Diseases*, 2, 321-335.
- Khardori N. and Fainstein V. (1988). Aeromonas and Plesiomonas as etiological agents. *Annual Review of Microbiology*, 42, 395-419.
- Kou G.H. (1972a). Studies on the occurrence and biochemical properties of virulent and avirulent strains of freshwater fish pathogen, *Aeromonas liquefaciens*. *Journal of the Fisheries Society of Taiwan*, 1, 8-13.
- Kou G.H. (1972b). Studies on the fish pathogen, *Aeromonas liquefaciens*-I. *Aquaculture*, 2, 22-33. (in Chinese).
- Kou G.H. (1973). Study on the fish pathogen, *Aeromonas liquefaciens* - II. The connections between pathogenic properties and the activities of toxic substances. *Journal of the Fisheries Society of Taiwan*, 2, 42-46.
- Lamers C.H.J., Haas M.J.H.de, and van Muiswinkel W.B. (1985). The reaction of the immune system of fish to vaccination: development of immunological memory in carp, *Cyprinus carpio* L., following direct immersion in *Aeromonas hydrophila* bacterin. *Journal of Fish Diseases*, 8, 256-262.
- Leblanc D., Mittal K.R., Olivier G. and Lallier R. (1981). Serogrouping of motile *Aeromonas* species isolated from healthy and moribund fish. *Applied and Environmental Microbiology*, 42, 56-60.
- Lewis D.H. and Allison T.C. (1971). An immunofluorescent technique for detecting *Aeromonas liquefaciens* in fish utilized in lunar exposure studies. *Transactions of the American Fisheries Society*, 100, 575-578.
- Lewis D.H. and Savage N.L. (1972). Detection of antibodies to *Aeromonas liquefaciens* in fish by an indirect fluorescent antibody technique. *Journal of the Fisheries Research Board of Canada*, 29, 211-212.
- MacInnes J.I., Trust T.J. and Crosa J.H. (1979). Deoxyribonucleic acid relationships among members of the genus *Aeromonas*. *Canadian Journal of Microbiology*, 25, 579-586.
- Martinez-Murcia A.J., Benlloch S. and Collins M.D. (1992). Phylogenetic interrelationships of members of the genera *Aeromonas* and *Plesiomonas* as determined by 16S ribosomal DNA sequencing: lack of congruence with results of DNA-DNA hybridization. *International Journal of Systematic Bacteriology*, 42, 412-421.
- Maruvada R., Das P., Ghosh A.N., Pal S.C. and Nair G.B. (1992). Electrophoretic mobility and immunoblot analysis of the outer membrane proteins of *Aeromonas hydrophila*, *A. sobria* and *A. caviae*. *Microbios*, 71, 105-113.
- McCoy R.H. and Seidler R.J. (1973). Potential pathogens in the environment: isolation, enumeration, and identification of seven genera of intestinal bacteria associated with small green pet turtles. *Applied Microbiology*, 25, 534-538.
- Millership S.E. and Want S.V. (1993). Characterization of strains of *Aeromonas* spp. By phenotype and whole-cell protein fingerprint. *Journal of Medical Microbiology*, 39, 107-113.
- Miyata M., Aoki T., Inglis V., Yoshida T. and Endo M. (1995). RAPD analysis of *Aeromonas salmonicida* and *Aeromonas hydrophila*. *Journal of Applied Bacteriology*, 79, 181-185.
- Miyazaki T. and Jo Y. (1985). A histopathological study of motile aeromonad disease in ayu. *Fish Pathology*, 20, 55-59.
- Miyazaki T. and Kaige N. (1985). A histopathological study on motile aeromonad disease of crucian carp. *Fish Pathology*, 21, 181-185.
- Moyer N.P. (1996). Isolation and enumeration of aeromonads. In: *The Genus Aeromonas*, pp.39-84, Austin B., Altweig M., Gosling P.J. and Joseph P. (eds.), John Wiley and Sons, Chichester, UK.
- Mulla R. and Millership S. (1993). Typing of *Aeromonas* spp. by numerical analysis of immunoblotted SDS-PAGE gels. *Journal of Medical Microbiology*, 39, 325-333.
- Palumbo S.A., Maxino F., Williams A.C., Buckanan R.L. and Thayer D.W. (1985). Starch-ampicillin agar for the quantitative detection of *Aeromonas hydrophila*. *Applied and Environmental Microbiology*, 50, 1027-1030.

- Popoff M. and Véron M. (1976). A taxonomic study of the *Aeromonas hydrophila*-*Aeromonas punctata* group. *Journal of General Microbiology*, 94, 11-22.
- Rippey S.R. and Cabelli V.J. (1979). Membrane filter procedure for enumeration of *Aeromonas hydrophila* in fresh waters. *Applied and Environmental Microbiology*, 38, 108-113.
- Ruangpan L., Kitao T. and Yoshida T. (1986). Protective efficacy of *Aeromonas hydrophila* vaccines in Nile tilapia. *Veterinary Immunology and Immunopathology*, 12, 345-350.
- Ruimy R., Breittmayer V., Elbaze P., Lafay B., Boussemaert O., Gauthier M. and Christen R. (1994). Phylogenetic analysis and assessment of the genera *Vibrio*, *Photobacterium*, *Aeromonas*, and *Plesiomonas* deduced from small-subunit rRNA sequences. *International Journal of Systematic Bacteriology*, 44, 416-426.
- Saitanu K. (1986). *Aeromonas hydrophila* infections in Thailand. In: *The First Asian Fisheries Forum*, pp.231-234, Maclean J.L., Dizon LB. and Hosillos L.V. (eds.), Asian Fisheries Society, Manila, Philippines.
- Sakazaki R. and Shimada T. (1984). O-serogrouping scheme for mesophilic *Aeromonas* strains. *Japanese Journal of Medical Science and Biology*, 37, 247-255.
- Schäperclaus W (1930) *Pseudomonas punctata* als Krankheitserreger bei Fischen. *Zeitung für Fischerei*, 28, 289-370.
- Schäperclaus W., Kulow H. and Schreckenbach K. (1992). Infectious abdominal dropsy. In: *Fish Diseases*, Vol 1, pp.401-458, Schäperclaus W. (ed.), Akademie-Verlag, Berlin, Germany.
- Seidler R.J., Allen D.A., Lockman H., Colwell R.R., Joseph S.W. and Daily O.P. (1980). Isolation, enumeration, and characterization of *Aeromonas* from polluted waters encountered in diving operations. *Applied and Environmental Microbiology*, 39, 1010-1018.
- Shaw D.H. and Hodder H.J. (1978). Lipopolysaccharides of the motile aeromonads: core oligosaccharide analysis as an aid to taxonomic classification. *Canadian Journal of Microbiology*, 24, 864-868.
- Shotts E.B. Jr. and Rimler R. (1973). Medium for the isolation of *Aeromonas hydrophila*. *Applied Microbiology*, 26, 550-553.
- Song Y.L., Chen S.N. And Kou G.H. (1976). Agglutinating antibodies production and protection in eel (*Anguilla japonica*) inoculated with *Aeromonas hydrophila* (*A. liquefaciens*) antigens. *Journal of the Fisheries Society of Taiwan*, 4, 25-29.
- Stevenson R.M.W. (1988). Vaccination against *Aeromonas hydrophila*. In: *Fish Vaccine*, pp.112-123, Ellis A.E. (ed.), Academic Press, London, UK.
- Sugita H., Nakamura T., Tanaka K. and Deguchi Y. (1994). Identification of *Aeromonas* species isolated from freshwater fish with the microplate hybridization method. *Applied and Environmental Microbiology*, 60, 3036-3038.
- Thune R.L. and Plumb J.A. (1982). Effect of delivery method and antigen preparation on the production of antibodies against *Aeromonas hydrophila* in channel catfish. *Progressive Fish-Culturist*, 44, 53-54.
- van der Kooij D. and Hijnen W.A. (1988). Nutritional versatility and growth kinetics of an *Aeromonas hydrophila* strain isolated from drinking water. *Applied and Environmental Microbiology*, 54, 2842-2851.
- Wakabayashi H., Kanai K., Hsu T.C. and Egusa S. (1981). Pathogenic activities of *Aeromonas hydrophila* biovar *hydrophila* (Chester) Popoff and Veron, 1976 to fishes. *Fish Pathology*, 15, 319-325.
- Wilcox M.H., Cook A.M., Thickett K.J., Eley A. and Spencer R.C. (1992). Phenotypic methods for speciating clinical *Aeromonas* isolates. *Journal of Clinical Pathology*, 45, 1079-1083.
- Wolf K. (1988). *Fish viruses and Fish Viral Diseases*. Cornell University of Press, 476 pp., Ithaca, New York, USA.

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