I - Personal details

Name, dob	Rüdiger Winfried SCHULZ, born 16 March 1956 in Essen (Germany)
Marital Status	Married to Ina-Maria Jürgenliemk-Schulz, three children
Hobbies	European history, languages, photography, hiking

II - Education

- October 1975 – February 1980

Student at the Ruhr-Universität in Bochum (Germany), Faculty of Biology. Graduation in Zoology (major), Sensory- and Neurophysiology (minor), Immunology (minor).

- March 1980 – January 1983

Ph.D. thesis research project ("Studies on the reproductive cycle of rainbow trout, *Salmo gairdneri*, Richardson") in the Department Animal Physiology in Bochum, supervised by Prof. Dr. V. Blüm.

III - Work Experience

- February 1983 - March 1990 (Germany)

Post-doctoral research projects, financed by grants from the "Deutsche Forschungsgemeinschaft", at the Ruhr-Universität Bochum.

- April 1990 – present (The Netherlands)

Assistant Professor and since January 2003 Associate Professor at Utrecht University, Faculty of Sciences, Department Biology, Section Endocrinology & Metabolism, since July 2009 in Section Developmental Biology.

- Since June 2003 – May 2010 (Norway)

Adjunct Research Professor (20% position) at the Institute of Marine Research in Bergen, Norway.

IV - Overview of Research, Teaching, and Administration/Management Activities

My research activities take place in the field of *Reproductive Biology*. Using morphological, physiological, and molecular approaches, I study the development and adult functioning of the endocrine system regulating reproduction, the brain-pituitary-gonad (BPG) axis, with fishes as experimental models. This field of fundamental research provides options for interaction with applied research areas, which I have developed in particular with respect to aquaculture but also with respect to ecotoxicology.

Areas of attention have been the production and release of hormones from the BPG axis, and the characteristics and expression of receptors for these hormones. In the recent years, I have paid specific attention to the testis and its two main functions, steroidogenesis and spermatogenesis. My ambition for the future is to improve our understanding of the endocrine and paracrine regulation of spermatogenesis, a major enigma of male reproduction in all vertebrates. The focus is placed on the regulation of the initial steps of this process, the activity of the spermatogonial stem cells, i.e. the balance between stem cell self-renew and differentiation, and stem cell interaction with the somatic Sertoli cells.

I have published 116 papers in peer-reviewed scientific journals (total citation record 2663; H-factor 30) and have been invited to present 18 lectures on international congresses. I have obtained research grants from national and international funding organisations, including the co-ordination of EU-financed projects, covering 49 man-years of salary. I have supervised post-doctoral fellows, PhD students, and technicians in context with these projects. Refereeing tasks have been fulfilled for 12 scientific journals, and for 6 funding organisations.

My contributions to curricula started in 1984. Next to Endocrinology and Reproductive Biology, including the supervision of master/doctoral students, my teaching dealt with subjects that were not directly related to my research expertise (for example, first year practical course in Zoology, or courses in General Histology). It is my experience that it is the integration of structural and functional information through different organisational levels in biology that leads to a comprehensive view of biological phenomena, and that brings about the satisfaction and enjoyment of learning that renders students (and their teachers) enthusiastic.

I have been an elected member of the Faculty Boards in Bochum and in Utrecht (2 terms each), and a member of international, national, and Faculty committees involved in research and teaching affairs. From 2004-2008, I was programme leader of the Master track Animal Biology. Since 2006, I am a member of the Board of Studies of the Utrecht Graduate School for Life Sciences.

V – Research Collaborations

I have a wide range of external collaborations with colleagues from several countries: Brazil, China, France, Germany, Japan, Norway, Portugal, Spain, Sweden, UK, and the USA. In my list of peer-reviewed publications, one third show an international authorship composition, indicating that my research is integrated in, and meets the interest of, the international scientific community. The basis for these collaborations have been joint research projects financed mostly extramurally, which were often realised during mutual research visits (for example, I have spent since 2000, two months in each, Sweden, Norway, and Japan, and three months in France). Amongst others, these international activities also have resulted in tasks in the international advisory board for two congress series (Fish Endocrinology; Reproductive Physiology of Fish), and in invitations to participate in the evaluation of the activities of research institutes (two times for an INRA institute in Rennes, France). Since 2009, I am a member of the scientific advisory board of the Leibniz-Institute of Freshwater Ecology and Inland Fisheries in Berlin, Germany.

VI – List of Publications

The following list presents my publications in peer-reviewed journals from the year 2001 onwards. Other publications (chapters in books, conference proceedings, meeting abstracts) are not detailed here.

64. Mikolajczyk T, Roelants I, Epler R, Ollevier F, Schulz RW, Sokolowska- Mikolajczyk M, Breton B (2001) Assessment of tissue damaging effects of mixed micellar absorption enhancers on the intestinal mucosa of common carp (*Cyprinus carpio*), African catfish (*Clarias gariepinus*) and rainbow trout (*Oncorhynchus mykiss*) as a consequence of enhanced intestinal absorption of sGnRH-a. J Appl Ichthyol 17, 267-272.
65. Bosma PT, Blazquez M, Fraser EJ, Schulz RW, Docherty K, Trudeau VL (2001) Sex steroid regulation of glutamate decarboxylase mRNA expression in goldfish brain is sexually dimorphic. J Neurochem 76, 945-956.
66. Cavaco JEB, van Baal J, van Dijk W, Hassing GAM, Goos HJTh, Schulz RW (2001) Steroid hormones stimulate gonadotrophs in juvenile male African catfish (*Clarias gariepinus*). Biol Reprod 64, 1358-1365.
67. Bogerd J, Blomenröhr M, Andersson E, van der Putten HHAGM, Tensen CP, Vischer H, Granneman JCM, Janssen-Dommerholt C, Goos HJTh, Schulz RW (2001) Discrepancy between molecular structure and ligand selectivity of a testicular gonadotropin receptor of the African catfish (*Clarias gariepinus*). Biol Reprod 64, 1633-1643.
68. Schulz RW, Vischer HF, Cavaco JEB, Santos EM, Tyler CR, Goos HJTh, Bogerd J (2001) Gonadotropins, their receptors, and the regulation of testicular functions in fish. Comp Biochem Physiol 129B, 407-417.
69. Cavaco JEB, Bogerd J, Goos HJTh, Schulz RW (2001) Testosterone inhibits 11-ketotestosterone-induced spermatogenesis in African catfish (*Clarias gariepinus*). Biol Reprod 65, 1807-1812.
70. Rebers FEM, Hassing GAM, van Dijk W, van Straaten E, Goos HJT, Schulz RW (2002) Gonadotropin-releasing hormone does not directly stimulate luteinizing hormone biosynthesis in male African catfish. Biol Reprod 66, 1604-1611.
71. Garcia Hernandez MP, Garcia Ayala A, Agulleiro B, Garcia A, van Dijk W, Schulz RW (2002). Development of a homologous radioimmunoassay for Mediterranean yellowtail (*Seriola dumerilii*, Risso 1810) LH. Aquaculture 210, 203-218.
72. Viveiros ATM, Fessehaye Y, ter Veld M, Schulz RW, Komen J (2002) Hand-stripping of semen and semen quality after maturational hormone treatments, in African catfish *Clarias gariepinus*. Aquaculture 213, 373-386.
73. Lokman PM, Harris B, Kusakabe M, Kime DE, Schulz RW, Adachi S, Young G (2002) 11-Oxygenated androgens in female teleosts: prevalence, abundance, and life history implications. Gen Comp Endocrinol 129, 1-12.
74. Schulz RW, Miura T (2002) Spermatogenesis and its endocrine regulation. Fish Physiol Biochem 26, 43-56.
75. Schulz RW, van Dijk W, Bogerd J (2003) Sertoli cell proliferation and FSH signalling in African catfish, *Clarias gariepinus*. Fish Physiol Biochem 28, 223-224.
76. Vischer HF, Teves ACC, Ackermans JCM, van Dijk W, Schulz RW, Bogerd J (2003) Cloning and spatio-temporal expression of the follicle-stimulating hormone β-subunit cDNA in the African catfish (*Clarias gariepinus*). Biol Reprod 68, 1324-1332.
77. Vischer HF, Granneman JCM, Linskens MHK, Schulz RW, Bogerd J (2003) Both recombinant African catfish LH and FSH are able to activate the African catfish FSH receptor. J Mol Endocrinol 31, 133-140.
78. Schulz RW (2003) Endocrine regulation of spermatogenesis in teleost fish. Ann Rev Biomed Sci 5, 57-68.
79. Vischer HF, Marquesa RB, Granneman JCN, Linskens MHK, Schulz RW, Bogerd J (2004) Receptor-selective determinants in catfish gonadotropin seat-belt l. Mol Cell Endocrinol 224, 55–63.

80. Bogerd J, Granneman JC, Schulz RW, Vischer HF (2005) Fish FSH receptors bind LH: how to make the human FSH receptor to be more fishy? Gen Comp Endocrinol 142, 34-43

81. Schulz RW, Menting S, Bogerd J, Franca LR, Vilela DA, Godinho HP (2005) Sertoli cell proliferation in the adult testis--evidence from two fish species belonging to different orders. Biol Reprod 73, 891-898.

82. Schulz RW, Andersson E, Taranger GL (2006) Photoperiod manipulation can stimulate or inhibit pubertal testis maturation in Atlantic salmon (*Salmo salar*). Anim Reprod 3, 121-126.

83. Goos HJTh, Blomenröhr M, Bogerd J, Bosma PT, Li KW, Okuzawa K, Rebers FEM, Schulz RW, Tensen CP, Zandbergen MA (2006) Gonadotropin-releasing hormones and their receptors in fish. Ann New York Acad Sci 839, 41-46.

84. Dijkstra PD, Hekman R, Schulz RW, Groothuis TGG (2007) Social stimulation, nuptial colouration, androgens and immunocompetence in a sexual dimorphic cichlid fish. Behav Ecol Sociobiol 61, 599-609.

85. Feitsma H, Leal MC, Moens PB, Cuppen E, Schulz RW (2007) Mlh1 deficiency in zebrafish results in male sterility and aneuploid as well as triploid progeny in females. Genetics 175, 1561-1569.

86. Zmora N, Kazeto Y, Sampath Kumar R, Schulz RW, Trant JM (2007) Production of recombinant channel catfish (*Ictalurus punctatus*) FSH and LH in S2 Drosophila cell line and an indication of their different actions. J Endocrinol 194, 407-416.

87. Schulz RW, Bogerd J, Male R, Ball J, Fenske M, Olsen LC, Tyler CR (2007) Estrogen-induced alterations in amh and dmrt1 expression signal for disruption in male sexual development in the zebrafish. Environmental Science & Technology 41, 6305-6310.

88. Almeida FFL, Kristoffersen C, Taranger GL, Schulz RW (2008) Spermatogenesis in Atlantic cod (*Gadus morhua* L.): a novel model of cystic germ cell development. Biol Reprod 78, 27-34.

89. Leal MC, Feitsma H, Cuppen E, França L, Schulz RW (2008) Meiosis can be completed in male zebrafish (*Danio rerio*) lacking the DNA mismatch repair gene mlh1. Cell & Tissue Res 332, 133-139.

90. Schulz RW, Liemburg M, García-López A, van Dijk W, Bogerd J (2008) Androgens modulate testicular androgen production in African catfish (*Clarias gariepinus*) depending on the stage of maturity and type of androgen. Gen Comp Endocrinol 156, 154-163.

91. Waal de PP, Wang DS, Nijenhuis WA, Schulz RW, Bogerd J (2008) Functional characterization and expression analysis of the androgen receptor in zebrafish (*Danio rerio*) testis. Reproduction 136, 225–234.

92. García-López A, Bogerd J, Granneman JCM, van Dijk W, Trant JM, Taranger GL, Schulz RW (2009) Leydig cells express FSH receptors in African catfish, *Clarias gariepinus*. Endocrinology 150, 357-365.

93. Almeida FFL, Taranger GL, Norberg B, Karlsen Ø, Bogerd J, Schulz RW (2009) Photoperiod-modulated testis maturation in Atlantic cod (*Gadus morhua*, L.). Biol Reprod 80, 631-640.

94. Leal MC, de Waal PP, Garcia-Lopez-A, Chen SX, Bogerd J, Schulz RW (2009) Zebrafish primary testis tissue culture: An approach to study testis function ex vivo. Gen Comp Endocrinol 162, 134-138.

95. Leal MC, Cardoso ER, Nobrega RH, Batlouni SR, Bogerd J, Franca LR, Schulz RW (2009) Histological and stereological evaluation of zebrafish (*Danio rerio*) spermatogenesis with an emphasis on spermatogonial generations. Biol Reprod 81, 177-187.

96. Waal de PP, Leal MC, García-López A, Liarte S, de Jonge H, Hinfray N, Brion F, Schulz RW, Bogerd J (2009) Oestrogen-induced androgen insufficiency results in a reduction of proliferation and differentiation of spermatogonia in the zebrafish testis. J of Endocrinol 202, 287-297.

97. Andersson E, Nijenhuis W, Male R, Swanson P, Bogerd J, Taranger GL, Schulz RW (2009) Pharmacological characterization, localization and quantification of expression of gonadotropin receptors in Atlantic salmon (*Salmo salar* L.) ovaries. Gen Comp Endocrinol 163, 329-339.

98. Schulz RW, de Franca LR, Lareyre JJ, LeGac F, Chiarini-Garcia H, Nobrega RH, Miura T (2010) Spermatogenesis in fish. Gen Comp Endocrinol 165, 390-411.

99. Taranger GL, Carrillo M, Schulz RW, Fontaine P, Zanuy S, Felip A, Weltzien F-A, Dufour S, Karlsen Ø, Norberg B, Andersson E, Hansen T (2010) Control of puberty in farmed fish. Gen Comp Endocrinol 165, 483-515.

100. Chen SX, Bogerd J, García-López A, de Jonge H, de Waal PP, Hong WS, Schulz RW (2010) Molecular cloning and functional characterization of a zebrafish nuclear progesterone receptor. Biol Reprod 82, 171-181.

101. García-López A, Jonge de H, Nóbrega RH, Waal de PP, Dijk van W, Hemrika W, Taranger GL, Bogerd J, Schulz RW (2010) Studies in zebrafish reveal unusual cellular expression patterns of gonadotropin receptor mRNA in the testis and unexpected functional differentiation of the gonadotropins. Endocrinology 151, 2349-2360.

102. Nóbrega RH, Greebe CD, van de Kant H, Bogerd J, de França LR, Schulz RW (2010) Spermatogonial stem cell niche and spermatogonial stem cell transplantation in zebrafish. PLoSONE 59(9), e12808 (PMID: 20862221).

103. Chen SX, Bogerd J, Andersson E, Almeida FFL, Taranger GL, Schulz RW (2011) Cloning, pharmacological characterization and expression analysis of Atlantic salmon (Salmo salar L.) nuclear progesterone receptor. Reproduction 141, 491-500.

104. Almeida FFL, Andersson E, Mittelholzer C, Karlsen Ø, Taranger GL, Schulz RW (in press) Pituitary gonadotropin and testicular gonadotropin receptor expression in Atlantic cod (Gadus morhua L.) during the first reproductive season: Effects of photoperiod modulation. Gen Comp Endocrinol (10.1016/j.ygcen.2011.05.002).

105. Skaar KS, Nóbrega RH, Magaraki A, Olsen LC, Schulz RW, Male R (2011) Proteolytically activated, recombinant anti-Müllerian hormone inhibits androgen secretion, proliferation, and differentiation of spermatogonia in adult zebrafish testis organ cultures. Endocrinology 152, 3527-3540.

106. Hinfray N, Baudiffier D, Leal MC, Porcher JM, Aït-Aïssa S, Le Gac F, Schulz RW, Brion F (2011) Characterization of testicular expression of P450 17α-hydroxylase, 17,20-lyase in zebrafish and its perturbation by the pharmaceutical fungicide clotrimazole. Gen Comp Endocrinol 174, 309-317.

107. Schulz RW, van Dijk W, Chaves-Pozo E, García-López A, de Franca LR, Bogerd J (2012) Sertoli cell proliferation in the adult testis is induced by unilateral gonadectomy in African catfish. Gen Comp Endocrinol 177, 160-167.

108. Baudiffier D, Hinfray N, Vosges M, Creusot N, Chadili E, Porcher JM, Schulz RW, Brion F (2012) A critical role of follicle-stimulating hormone (Fsh) in mediating the effect of clotrimazole on testicular steroidogenesis in adult zebrafish. Toxicology 298, 30-39.

109. Haugen T, Almeida FF, Andersson E, Bogerd J, Male R, Skaar KS, Schulz RW, Sørhus E, Wijgerde T, Taranger GL (2012) Sex differentiation in Atlantic cod (*Gadus morhua* L.): morphological and gene expression studies. Reprod Biol Endocrinol 10, 47 (PMID: 22709434 / http://www.rbej.com/content/10/1/47).

110. Chen SX, Almeida FFL, Andersson E, Taranger GL, Schmidt R, Schulz RW, Bogerd J (2012) Cloning, pharmacological characterization and expression analysis of Atlantic cod (*Gadus morhua*, L.) nuclear progesterone receptor. Gen Comp Endocrinol 179, 71-77.

111. Shao YT, Schulz RW, Borg B (2012) Homeostasis of circulating androgens levels in the breeding male three-spined stickleback (*Gasterosteus aculeatus*). Zool Sci 51(8), 1282-1289.

112. Shao YT, Arvidsson M, Trombley S, Schulz RW, Schmitz M, Borg B (2013) Androgen feedback effects on LH and FSH, and photoperiodic control of reproduction in male three-spined sticklebacks, *Gasterosteus aculeatus*. Gen Comp Endocrinol 182, 16-23.

113. Hinfray N, Nóbrega RH, Caulier M, Baudiffier D, Maillot-Maréchal E, Chadili E, Palluel O, Porcher J-M, Schulz RW, Brion F (2013) Cyp17a1 and Cyp19a1 in the zebrafish testis are differentially affected by œstradiol. J Endocrinol 216, 375-388.

114. Chen SX, Bogerd J, Schoonen NE, Martijn J, de Waal PP, Schulz RW (2013) A progestin (17α,20β-dihydroxy-4-pregnen-3-one) stimulates early stages of spermatogenesis in zebrafish. Gen Comp Endocrinol 185, 1-9.

115. Baudiffier D, Hinfray N, Ravaud C, Creusot N, Chadili E, Porcher JM, Schulz RW, Brion F (2013) Effect of *in vivo* chronic exposure to clotramizol on zebrafish testis function. Environ Sci Pollut Res Int 20, 2747-2760.

116. Andersson E, Schulz RW, Male R, Bogerd J, Patiña D, Benedet S, Norgberg B, Taranger GL (2013) Pituitary gonadotropin and ovarian gonadotropin receptor transcript levels: Seasonal and photoperiod-induced changes in the reproductive physiology of female Atlantic salmon (*Salmo salar*). Gen Comp Endocrinol 191, 247-258.