



Samir Bhattacharya

1. NAME: SAMIR BHATTACHARYA, FNA, FNASc, FASc

2. PRESENT ADDRESS:

- (i) Emeritus Professor
School of Life Science
Centre of Advanced Study in Zoology
Visva Bharati (A Central University)
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3. DATE OF BIRTH: 21-11-1942

4. ACADEMIC QUALIFICATIONS:

M. Sc. (Presidency College, University of Calcutta)

Ph. D (Research at IICB, a National Institute, degree obtained from the University of Calcutta)

5. PROFESSIONAL CAREER

Sl.No	Institution	Status	Year	Nature of work
01	Visva-Bharati (A Central University), School of Life Sciences, Dept. of Zoology, Santiniketan –731235.	Professor of Zoology since 1986 (joined as Lecturer in 1971)	1971 - 1999	Teaching and Research
		Professor-in-charge, M.Sc. Biotechnology	1997	Organizing the teaching curriculum of Biotechnology
02	Indian Institute of Chemical Biology (A CSIR Institute)	Director	Aug1999 – Aug 2004	Research and Administration
03	Visva-Bharati (A Central University), School of Life Sciences, Dept. of Zoology, Santiniketan –731235.	Professor	Aug 2004 - Dec 2007	Teaching and Research
		INSA Senior Scientist	Jan 2008 - Till date	
04	University of Washington, Seattle, USA	Senior Fulbright Award from US Federal Govt. (Obtained twice)	1975-1976	For Advanced Research
			1983-1984	

05	Waseda University, Tokyo, Japan	Visiting Scientist	1989	For Collaborative Research
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6. NO. OF PUBLICATIONS

International and National: **132**

7. NO. OF Ph. D. PRODUCED: 45

8. INTERNATIONAL/NATIONAL PATENTS: 23
(Applied/ approved)

9. AWARD/HONOUR/PRIZE/CERTIFICATE ETC.

- I. Elected **Fellow of Indian National Science Academy (FNA), New Delhi** (1990).
- II. Elected **Fellow of the National Academy of Sciences, India (FNASc.), Allahabad** (1994).
- III. Elected **Fellow of the Indian Academy of the Sciences (FASc), Bangalore** (1996).
- IV. Obtained **Senior Fulbright Award** from Federal Government, USA, twice, in 1975 and 1983.
- V. Awarded in 1992 **J.G. Law Memorial Medal** by the Asiatic Society, which is given for highly significant contribution to the knowledge of Animal Science.
- VI. **President "Asia and Oceania Society for Comparative Endocrinology (AOSCE)",** An international organization of 19 countries, Executive committee elected S. Bhattacharya as the President of the Society from 2000 to 2004.
- VII. **M.R.N. Prasad Memorial Lecture Award**, 1998, Indian National Science Academy, New Delhi for significant contribution in Animal Physiology.
- VIII. **Meghnad Saha Endowment Memorial Lecture Award**, 1999 from the IACS.
- IX. Obtained prestigious **Rafi Ahmed Kidwai Award** in 1999 for outstanding contribution in Agricultural Science by ICAR, Ministry of Agriculture, New Delhi.
- X. **President, Biochemistry, Biophysics and Molecular Biology Section of 89th Indian Science Congress** (2002), Lucknow.
- XI. Obtained prestigious **Barclay Memorial Gold Medal Award for the year 2001** for his

conspicuously important contribution to Science including Medicine from **The Asiatic Society**.

- XII. **Federation of Indian Chamber of Commerce and Industries (FICCI) Award** 2001-2002 for excellence in Biotechnology
- XIII. **CSIR Technology Award**, 2002 for outstanding contribution in health science.
- XIV. **B. C. Guha Memorial Lecture Award**, 2004 by the Indian Science Congress Association.
- XV. **Professor B. Kizar Ahamath Endowment lecture** (Medicine), 2004 at Institute of Basic Medical Sciences, Madras University, Chennai.
- XVI. Member of editorial board and reviewer in numbers of international and national journals.
- XVII. Delivered Dr. B. Mukherjee Memorial Lecture, a prestigious lecture of Central Drug Research Institute, CSIR, Lucknow, July 6, 2005.
- XVIII. Received prestigious **Kamal Kumari Memorial Award** for contribution in Life Science by Kamal Kumari Foundation, Guwahati, 2005.
- XIX. Delivered prestigious **16th Sidhu Memorial Science Lecture** at the Indian Institute of Chemical Technology, CSIR, Hyderabad, August 2, 2006.
- XX. Invited to deliver a lecture on Annual Seminar Program of **University of Washington**, Seattle, USA, in May, 2006
- XXI. Invited to deliver a special lecture on "Molecular mechanism of Diabetes" by the **University of Georgetown**, Washington D.C, USA, 2006
- XXI. **C.K. Hora Gold Medal** from Indian National Science Academy, New Delhi, 2007
- XXII. **Sam G.T. Moses Award** from RSSDI, Kolkata, 2007 for significant contribution in Diabetes mellitus.
- XXII. Delivered 14th **J.N. Baruah Memorial Lecture Award** of Assam Science Society at Tezpur on September 2, 2008.
- XXIII. **CSIR Foundation Day lecture** jointly organized by four CSIR institutes at Lucknow i.e. CDRI, CMAP, NBRI, IITR on September 26, 2008.
- XXIV. Delivered First **N. R. Dhar Memorial Lecture Award** at University of Allahabad on February 06, 2010
- XXV. **Korean Endocrine Society, Seoul**, invites 3-5 foreign scientists to honour them for significant contribution. In 2011 they selected Dr. S. Bhattacharya along with 2 other foreign scientists for this purpose and requested to give a lecture in their Annual Conference which was held on April 29-30 at Seoul Hilton Hotel.
- XXVI. **University of Cambridge**, UK is presently number one university in world ranking whereas Harvard, USA is number two. Every year Cambridge University invites a few

persons depending on their contribution to deliver 'Guest Lecture' and this year they invited Dr. S. Bhattacharya, the lecture was delivered on September 23, 2011.

XXVII. Govt. of India awarded him **CSIR-Technology award** in 2013 for discovering Anti-arthritis medicine along with the NEIST scientists.

XXVIII. Invited by the department of Bio Medical Sciences, East Tennessee University, USA to give a special seminar lecture on his contributions to understand relationship between lipid induced insulin resistance, inflammation and immunity on August 28, 2013.

XXIX. Received prestigious Prof. S. C. Mahalanobis Memorial Oration, for the year 2012 from the Physiological Society of India.

10. INTERNATIONAL PATENTS (Applied/Granted):

1. R. Bhadra, BC Pal, K. Das and **S. Bhattacharya**: "Murraya koenigii extract, herbal composition for treating Asthma", PCT/IN/00/00102 dt 16.10.2000; US Patent No. 6746694 dt 08.06.2004.

2. S. Bandyopadhyay, BC Pal, **S. Bhattacharya**, M. Ray and KC Roy: "Antimonocytic activity of Betal leaf Extract", a herbal product./ PCT/IN/00/00118 dt. 4.12.2000, US 09/772003 dt.31.01.2001

3. S. Bandyopadhyay, BC Pal, **S. Bhattacharya**, M. Ray and KC Roy: 'Antileishmanicidal activity of Betal leaf Extract', PCT/IN/00/00119 dt 04.12.2000, US 6610332B2 Date Aug.26, 2003

4. S. Bandyopadhyay, BC Pal, **S. Bhattacharya**, M. Ray and KC Roy: 'Use of Betal leaf extract to induce IFN- γ production from human peripheral blood T cells and as a TH1 type immunomodulator'. PCT/In/00/00127 dt 18.12.2000; US patent appl No. 09/746017 dt 26.12.2000

5. S. Bhattacharya, A.K.Bhattacharya, A.Pal and S. Sarkar.: 'Development of vaginal contraceptive with clove oil.' US Patent appl. No. 60/316263, filing dt. 04.09.2001

6. S. Bandyopadhyay, R Bhadra, BC Pal, **S. Bhattacharya**, K. Das, M. Ray and KC Roy: "Herbal formulation useful for blocking of 5-Lipoxygenase activity leading to the inhibition of leukotriene synthesis, suppression of IL-4 production and enhancement of IFN gamma release.' US Patent No.09/925415; dt 08.10.2001.

7. S. Bandyopadhyay, K.C.Roy, M.Ghosh, M.Ray, C.Pal, **S. Bhattacharya**: 'A novel in vitro method to generate dendritic langerhans type cells using platelets.' US patent appl. No. 09/ 800448 dt. 05.03.2001

8. **S.Bhattacharya**, S. S. Roy, M. Mukherjee, C. Mandal, S. Dasgupta.: 'A novel insulin gene from carp adipocyte expressing a new biologically active insulin protein.' Sent to CSIR for PCT appl, dt. 13.08.2002

9. P.K.Das, N.P.Sahu, S.Banerjee, S.Sett, S.Goswami and **S.Bhattacharya**.: 'Anti-peptic ulcer activity of an extract of plant flower.' US Patent appl. No. 10/397194 dt.27.03.2002

10. **S.Bhattacharya**: ‘A protein from the coelomic fluid of an Indian earthworm , *Pheretima posthuma*, that causes immotility of sperms.’ US patent No. 6569464, dt. 27.05.2003
11. **S.Bhattacharya**: ‘Regulatory sequence elements of the cold inducible gene from the psychotropic bacterium *Pseudomonas syringae*.’ NF-509/01, Country: US complete specification filed dt. 23.01.2003
12. **S.Bhattacharya**: ‘Two novel GnRHs from Indian Murrel brain : Highly potential molecule for induced breeding of fish. US patent appl No. 10/354433 dt. 28.01.2003
13. **S.Bhattacharya**: ‘An adipocyte insulin , a new cell secreting Insulin and a process of treating diabetes.’ NF-223/02, Country : US, Filing date 26.03.2003
14. S. Bandyopadhyay, BC Pal, **S. Bhattacharya**, T. Biswas, M. Ray and K.C. Roy: “ A herbal medicine/ herbal based composition to treat acute and chronic myeloid leukemia”. US 10/448398 dt.30.05.2003
15. S. Bandyopadhyay, BC Pal, **S. Bhattacharya**, M. Ray and K.C. Roy: “ A herbal molecule as potential anti-leukemic drug”. US patent appl.No.10/613122 dt 07.07.2003
16. S. Bandyopadhyay, R. Bhadra, BC Pal, **S. Bhattacharya**, K. Das, M. Ray and KC Ray: “An herbal composition of blend of active components prepared from *M. Koenigii* and *P.betal* useful for blocking of 5-Lipoxygenase activity leading to the inhibition of leukotriene synthesis, suppression of interleukin-4 production and enhancement of gamma interferon release: US Patent No 6773728 dt.10.08.2004.
17. **S. Bhattacharya**, B. C. Pal, A. Bandyopadhyay, S. S. Roy, S. K. Mandol, B. B. Giri, D. Dey. T. Biswas and A. Konar “ A herbal extract and herein a lupinose as potential anti-diabetic type II drug from *Pueraria Tuberosa*”. U.S. patent appl No. 60/ 535332, date 09.01.2004
18. S. Sinha, B. C. Pal and **S. Bhattacharya** “A pharmaceutical composition useful for the treatment of *Murraya koenigii* for treatment of prostate cancer” 2335/ DEL/ 2005 dt 25.04.2006
19. M. K. Chaudhuri, S. Hussain, S. Bharadwaj, U. B. Sinha, D. Talukdar, A. Usmani, S. S. Majumdar, S. Bhattacharya, S. Dasgupta, R. Kundu, S. Bhattacharya, **S. Bhattacharya**; Insulin mimetic active comprising oxodiperoxo vanadates and a pharmaceutical composition obtained thereof. PCT International Application No. PCT/IN2011/000386.
20. S. Bhattacharya, S. Dasgupta, P. Barma, A. Biswas, B. C. Pal, S. Bhattacharya, **S. Bhattacharya**, M. Bordoloi, N. C. Barua, P. G. Rao; Both Daidzin and Daidzein inhibit NF-kB gene expression. Patent Application No. 1590DEL2010 and PCT/IN2011/001580.
21. M. Bhuyan, P. R. Bhattacharyya, P. K. Baruah, N. C. Barua, P. G. Rao, S. Bhattacharya, R. Kundu, P. Chatterjee, S. Seal, S. Mukharjee, S. Dasgupta, S. Maitra, S. Bhattacharya, **S. Bhattacharya**; Vapour of plant extracts and compound(s) there from kill cancer cells through apoptosis; Patent Application No 0670DEL2011.
22. R. Kundu, S. Dasgupta, A. Biswas, B. C. Pal, S. Bhattacharya, **S. Bhattacharya**, N. C. Barua, P. G. Rao; UDP-Glucuronosyl transferase (UGT) expression stimulant to reduce bilirubin

accumulation in liver and pharmaceutical compositions thereof; Patent Application No. 0136DEL2010.

23. A. Datta, **S. Bhattacharya**, B. C. Pal, J. Sen, S. Dasgupta, A. Biswas, J. Batra; Process for production of anti-diabetic compound in root culture of *Catharanthus roseus*. International Publication No. WO/2010/004584 Publication Date: 14.01.2010

11. Area of Research:

(a) Cell biology and Biochemistry

(b) Molecular Signaling

(c) Molecular basis of Diseases (Diabetes and Cancer).

12. LIST OF PUBLICATIONS:

- 1) **S. Bhattacharya** and A.G. Datta (1970). Studies on the in vitro formation of monoiodotyrosine by soluble supernatant of pigeon thyroid gland. *J. Exp. Physiol.* (Physiological Society, London), **55** : 154-172.
- 2) **S. Bhattacharya** and A.G. Datta (1971). A comparative study of peroxidase from thyroid glands of pigeon (*Columba livia domestica*) and common myna (*Acridotheris tristis*) *Comp. Biochem. Physiol.* (Pergamon Press, U.K.), **40**: 139-145.
- 3) **S. Bhattacharya** and A.G. Datta (1971). Studies on the in vitro formation of monoiodotyrosine soluble supernatant enzyme from pigeon thyroid. *J. Reprod. Fert.* **27**: 306.
- 4) **S. Bhattacharya** (1972). Synthesis of diiodotyrosine from monoiodotyrosine soluble supernatant enzyme from pigeon thyroid gland. *Enzymologia* (W.J. Publishers, Hague, The Netherlands), **42** : 107-114.
- 5) **S. Bhattacharya**, P. Dasgupta and S. Mukherjee (1973). A comparative study of head and tail kidney peroxidase in a fish (*Clarias batrachus*). *Comp. Biochem. Physiol.* (Pergamon Press, U.K.), **44** : 693-700.
- 6) **S. Bhattacharya** and A.G. Datta (1973). In vitro iodination of thyroxine by a soluble supernatant preparation from pigeon thyroid gland and effect of ascorbic acid on it. *Indian Council of Medical Research* (ICMR, India), Series No. **21** : 111-123.

- 7) D. Kumar, P. Dasgupta and **S. Bhattacharya**(1973). In vitro demonstration of peroxidase activity in the fish kidney soluble supernatant and its physiological importance. *Experientia* (Birkhauser, Verlag Basel, Switzerland), **29** : 1076-1078.
- 8) Shelley Bhattacharya, S. Mukherjee and **S. Bhattacharya** (1974). Na⁺ion as an activator of amylase. *Expeerientia* (Birkhauser, Verlag Basel, Switzerland), **30** : 1133-1134.
- 9) P. Dasgupta and **S. Bhattacharya** (1974). Synthesis of iodotyrosines by fish (*Anabas testudineus*) head and tail kidney. *Indian J. Exp. Biol.* (CSIR, New Delhi, India), **12** : 49-51.
- 10) **S. Bhattacharya**, S. Mukherjee and S. Bhattacharya (1975). Toxic effects of endrin on hepatopancreas of teleosts, *Clarias batrachus*. *Indian J. Exp. Biol.* (CSIR, New Delhi, India), **13** : 185.
- 11) **S. Bhattacharya** and P. Dasgupta (1975). Formation of thyroxine by fish kidney soluble supernatant. *Experientia* (Birkhauser, Verlag Basel, Switzerland), **31** : 689.
- 12) D. Kumar and **S. Bhattacharya** (1975). Effect of endrin on the head kidney peroxidase activity of a fish *Anabus testudineus*. *Indian Biologists VII* : 47-51.
- 13) **S. Bhattacharya**, P. Dasgupta and D. Kumar (1976). Thyroid hormone synthesis by pharyngeal and head kidney preparation from a teleost fish, *Clarias batrachus*. *Indian J. Exp. Biol.* (CSIR, New Delhi, India), **14**: 227-231.
- 14) **S. Bhattacharya**, R. Das and A.G. Datta (1976). Iodine metabolism in dispersed pharyngeal and head kidney teleostean thyroid cells obtained by continuous trypsinization. *Gen. Comp. Endocrinol.* (Academic Press, New York, USA); **30** : 128.
- 15) S.N. Dey and **S. Bhattacharya** (1976). Effect of some industrial pollution on fish thyroid peroxidase activity and role of cytochrome thereon. *Indian J. Exp. Biol.* (CSIR, New Delhi, India), **14** : 561-563.
- 16) J.Y.L. Yu, **S. Bhattacharya**, A. Gorbman (1976). Stimulation by thyrotropin of synthesis of poly-(A)-RNA and non poly-(A)-RNA in rat thyroid tissue. *Life Science* (Pergamon Press, U.K.) **19** : 927-928.
- 17) D. Kumar and **S. Bhattacharya** (1977). Reversibility of endrin inhibited amylase activity from fish liver. *Indian J. Exp. Biol.* (CSIR, New Delhi, India), **15**: 927-928.
- 18) **S. Bhattacharya**, D. Kumar and R.H. Das (1978). Inhibition of thyroid hormone formation by endrin in the head kidney preparation of a teleost, *Anabas testudineus* (Bloch). *Indian J. Exp. Biol.* (CSIR, New Delhi, India), **16** : 1310-1312.
- 19) S. Sen and **S. Bhattacharya** (1978). Effect of estradiol and LH on rat uterine ascorbic acid depletion. *J. Steroid Biochem.* Fifth International Congress on Hormonal Steroids, New Delhi, Oct.29 – Nov.4, 1978, **9** : 873.
- 20) P. Chakraborty and **S. Bhattacharya** (1978). Bovine TSH stimulation of fish thyroid peroxidase activity and role of thyroxine thereon. *Experientia* (Birkhauser, Verlag Basel, Switzerland), **34**: 136-137.

- 21) **S. Bhattacharya**, D. Mukherjee and S. Sen (1978). Role of mammalian synthetic TRH on teleosts thyroid peroxidase activity. *Comparative Endocrinology*. Caillard, P.G. and Boer, H.H. (eds), (Elsevier, North-Holland Biomedical Press, Amsterdam), 375.
- 22) S. Sen, D. Mukherjee, P. Chakraborti and **S. Bhattacharya** (1979). 17β -Hydroxysteroid dehydrogenase activity in the ovary and head kidney of teleosts. *Proc. Indian Natn. Sci. Acad.* **B45** : 534-538.
- 23) **S. Bhattacharya**, D. Mukherjee and S. Sen (1979). Role of synthetic mammalian thyrotropin releasing hormone on fish thyroid peroxidase activity. *Indian J. Exp. Biol.* (CSIR, New Delhi, India). **17** : 1041-1043.
- 24) S. Sen and **S. Bhattacharya** (1981). Role of thyroxine and gonadotroin on the mobilization of ovarian cholesterol in a teleost, *Anabas testudineus* (Bloch). *Indian J. Exp. Biol.* (CSIR, New Delhi, India), **19** : 408-412.
- 25) D. Mukherjee and **S. Bhattacharya** (1981). A sensitive and easy bioassay for teleost gonadotropin depending on the ovarian free cholesterol depletion in vitro. *Gen. Comp. Endocrinol.* (Academic Press, New York, USA), **45** : 249-255.
- 26) D. Mukherjee and **S. Bhattacharya** (1982). Ovarian cholesterol dynamics in teleost, *Channa punctatus* (Bloch): Relationship with reproductive cycle and response to gonadotropins. *Gen. Comp. Endocrinol.* (Academic Press, New York. USA), **46**: 141-149.
- 27) S. Deb, D. Mukherjee, **S. Bhattacharya** (1982). Interrelationship between plasma and ovarian cholesterol in a teleost fish. *Experientia* (Birkhauser, Verlag Basel, Switzerland), **39** : 427-428.
- 28) P. Chakraborty and **S. Bhattacharya** (1982). Influence of gonadotropins and gonadal hormones on perch thyroid nucleic acid. *Endocrinologie* (J.A.B. Publishers, Leipzig, E. Germany), **80** : 213-219.
- 29) S. Sen and **S. Bhattacharya** (1982). Hormonal influence on perch ovarian 17β -hydroxysteroid dehydrogenase activity in in vitro system. *Indian J. Exp. Biol.* (CSIR, New Delhi, India), **80** : 213-219.
- 30) P. Chakraborty, D.K. Rakshiit and **S. Bhattacharya** (1983). Influence of season, gonadotropins and gonadal hormones on the thyroid activity of freshwater perch. *Anabas testudineus* (Bloch). *Canad. J. Zool.* (National Research Council, Canada), **61** : 39-364.
- 31) Md. Jamaluddin, P. Chakraborty and **S. Bhattacharya** (1983). Hormonal regulation of plasma thyroxine level in a murrel, *Channa punctatus* (Bloch). *Indian J. Exp. Biol.* (CSIR, New Delhi, India), **21**: 386-389.
- 32) **S. Bhattacharya**, E. Pliseyskaya, W.W. Dickhoff and A. Gorbman (1983). Insulin effects on in vitro protein metabolism and glycogen content in hepatocytes of juvenile salmon. *Amer. Zool.* (ASZ, USA), **23**: 010.

- 33) P. Chakraborty and **S. Bhattacharya** (1984). Plasma thyroxine level in freshwater perch : Influence of season, gonadotropins, and gonadal hormones. *Gen. Comp. Endocrinol.* (Academic Press, New York, USA), **53** : 179-186.
- 34) E. Plisetskaya, **S. Bhattacharya**, W.W. Dickhoff and A.Gorbman (1984). The effect of insulin on amino acid metabolism and glycogen content in isolated liver cells of juvenile coho salmon – *Onchorynchus kisutch*. *Comp. Biochem. Physiol.* (Pergamon Press, UK), **78A** : 773-778.
- 35) P. Chakraborty, G. Maitra and **S. Bhattacharya** (1984). Effect of gonadotropins and gonadal hormones on female fish thyroid peroxidase activity. *Indian J. Biochem. Biophys.* (CSIR, New Delhi, India), **21** : 85-88.
- 36) **S. Bhattacharya**, E. Plisetskaya, W.W. Dickhoff and A.Gorbman (1985). The effects of estradiol and triiodothyronine on protein synthesis by hepatocytes of juvenile coho salmon (*Onchorynchus kisutch*). *Gen. Comp. Endocrinol.* (Academic Press, New York, USA), **57** : 103-109.
- 37) S. Sen, S. Dev and **S. Bhattacharya** (1985). Equilibrium of free and ester cholesterol in a freshwater perch, *Anabas testudineus*, in different seasons and in response to gonadotropin and thyroid hormone. *Comp. Physiol. Ecol.* (Premior publication, India), **10** : 61-70.
- 38) S. Deb, Md. Jamaluddin, **S. Bhattacharya**, R. Bhadra and A.G. Datta (1985). Bioassay of fish gonadotropin by ovarian mitochondrial cholesterol depletion. *Gen. Comp. Endocrinol.* (Academic Press, New York, USA), **57**: 491-495.
- 39) **S. Bhattacharya**, S. Sen and S. Deb (1985). Hormonal regulation of ovarian 17 β -hydroxysteroid dehydrogenase in teleost. *Current Trends in Comparative Endocrinology*, eds by B. Loft and W.N. Holmes (Hong Kong University Press, Hong Kong) Vol. **I** : 237.
- 40) P. Chakraborty, G. Maita and **S. Bhattacharya** (1986). Binding of thyroid hormone to isolated ovarian nuclei of fresh-water perch, *Anabas testudineus*. *Gen. Comp. Endocrinol.* (Academic Press, New York, USA), **62** : 239-246.
- 41) S. Deb and **S. Bhattacharya** (1986). Circulatory cholesterol as an important source of substrate for piscine ovarian steroidogenesis. *Indian J. Exp. Biol.* (CSIR, New Delhi, India), **24**: 71-76.
- 42) P.P. Banerjee, **S. Bhattacharya** and P. Nath (1986). Fish Gonadotropin Hormone : Nature and properties in Endocrinology, a book ed. By C.P. Puri and T.C. Anand Kumar, Published by *Endocrine Society, India*, 86-93.
- 43) Md. Jamaluddin and **S. Bhattacharya** (1986). In-vitro binding of gonadotropin to fish ovary, *J. Endocrinol. (U.K.)*, **111 (3)**: 407-413.
- 44) P. Banerjee, Md. Jamaluddin, **S. Bhattacharya**, P. Nath, M. Kobayashi, K. Aida and I. Hanyu (1987). Development of heterologous radioimmunoassay for India carp and murrel gonadotropin hormone. *Indian J. Exp. Biol.* (CSIR, New Delhi, India), **25** : 220-227.

- 45) K. Kaul and **S. Bhattacharya** (1988). Thyroid hormone stimulation of the perch (*Anabas testudineus*, Bloch) ovarian mitochondrial steroidogenesis. *Indian J. Exp. Biol.* (CSIR, New Delhi, India), **26** : 413-417.
- 46) S. Deb and **S. Bhattacharya** (1988). Mechanism involved in gonadotropin stimulation of ovarian steroidogenesis. *Indian J. Biochem. Biophys.* (CSIR, New Delhi, India), **25(4)** : 344-349.
- 47) **S. Bhattacharya**, J. Banerjee, Md. Jamaluddin, P.P. Banerjee and G. Maitra (1988). Thyroid hormone binds to human corpus luteum. *Experientia* (Birkhauser, Verlag Basel, Switzerland), **44** : 1005-1007.
- 48) P. P. Banerjee, **S. Bhattacharya** and P. Nath (1989). Purification and properties of pituitary gonadotropic hormone from Indian teleosts : freshwater murrel (*Channa unctatus*) and carp (*Catla catla*). *Gen. Comp. Endocrinol.* (Academic Press, New York, USA), **73** : 118-128.
- 49) Md. Jamaluddin, P.P. Banerjee, P.R. Manna and **S. Bhattacharya** (1989). Requirement of extracellular calcium in fish pituitary gonadotropin release by gonadotropin releasing hormone. *Gen. Comp. Endocrinol.* (Academic Press, New York, USA), **74** : 190-198.
- 50) P.R. Manna, P.P. Banerjee and **S. Bhattacharya** (1989). Homologous radioimmunoassay and radioreceptorassay of gonadotropic hormone for an Indian carp, *Catla catla*, *Indian J. Exp. Biol.* (CSIR, New Delhi, India), **27** : 399-403.
- 51) G. Maitra and **S. Bhattacharya** (1989). Seasonal profile of triiodothyronine binding to piscine ovarian nuclei. *Zool. Sci.* (Japan), **6**: 771-776.
- 52) P. Ghosh, **S. Bhattacharya** and Shelley Bhattacharya (1989). Impact of nonlethal levels of Metacid-50 and Carbaryl on thyroid function and cholinergic system of *Channa punctatus*. *Biomed. Environ. Sciences.* (Academic Press, New York, USA), **2**: 92-97.
- 53) J. Mukherjee, **S. Bhattacharya** and P. Nath (1989). Annual changes in ovary and vitellogenin content of liver, serum and ovary of murrel, *Channa punctatus* (Bloch). *Indian J. Exp. Biol.* (CSIR, New Delhi, India), **27** : 764-769.
- 54) **S. Bhattacharya**, P.R. Manna, S. Halder and Md. Jamaluddin (1990). Requirement of extracellular calcium in gonadotropin releasing hormone action. *Progress in Comparative Endocrinology*, Wiley-Liss, Inc. USA, **342** : 572-577.
- 55) **S. Bhattacharya** and P.P. Banerjee (1990). Environmental and endocrine control of fish reproduction, *Impact of Environment on animal and Aquaculture* (India), 85-90.
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