Bruce D. Goldman
Curriculum Vitae

Date of Birth: December 11, 1940
Place of Birth: Gary, Indiana

Education:

Institution	Degree	Year	Field
University of Michigan, Ann Arbor	B.S.	1962	Zoology
University of Wisconsin, Madison	M.S.	1966	Zoology
Medical College of Georgia, Augusta	Ph.D.	1968	Endocrinology
University of Texas Medical School, Dallas	Postdoc.	1969	Endocrinology
University of California, Los Angeles	Postdoc.	1970	Neuroendo-crinology

Research and Professional Experience:

2003-present	Professor Emeritus, Department of Physiology and Neurobiology and Department of Ecology and Evolutionary Biology, University of Connecticut
1987-2003	Professor, Department of Physiology and Neurobiology, University of Connecticut
1981-1987	Senior Scientist, Worcester Foundation for Experimental Biology
1979-1980	Professor, Department of Biobehavioral Sciences, University of Connecticut
1975-1979	Associate Professor, Department of Biobehavioral Sciences, University of Connecticut
1970-1975	Assistant Professor, Department of Biobehavioral Sciences, University of Connecticut
1969-1970	Postdoctoral Research Associate, UCLA School of Medicine (with Dr. Roger A. Gorski)
1968-1969	Postdoctoral Research Associate, University of Texas Medical School at Dallas (with Dr. John C. Porter)

Major Research Interests: Neuroendocrinology, Biological Rhythms

Honors:

Member, Endocrinology Study Section (NIH), 1975-1979
Member, Biopsychology Study Section (NIH), 1983-1987
Associate Editor, *Journal of Biological Rhythms*, 1985-1995

PUBLICATIONS

1. Goldman BD and Mahesh VB 1968. Fluctuations in pituitary FSH during the ovulatory cycle in the rat and a possible role of FSH in the induction of ovulation. *Endocrinology* 83:97-106

2. Goldman BD and Mahesh VB 1969. A possible role of acute FSH-release in ovulation in the hamster, as demonstrated by utilization of antibodies to LH and FSH. *Endocrinology* 84:236-243

3. Goldman BD, Kamberi IA, Siiteri PK and Porter JC 1969. The temporal relationship of progestin secretion, LH release and ovulation in rats. *Endocrinology* 85:1137-1143

4. Porter JC, Goldman BD and Wilber JF 1969. Hypophysiotropic hormones in portal vessel blood. Proceedings of the Workshop on Bioassay and Chemistry of the Hypophysiotropic Hormones of the Hypothalamus, Tuscon, Arizona, January 8-11

5. Goldman BD and Mahesh VB 1970. Induction of infertility in male rats by treatment with gonadotropin antiserum during neonatal life. *Biol Reprod* 2:444-451

6. Goldman BD and Porter JC 1970. Serum LH levels in intact and castrated golden hamsters. *Endocrinology* 87:676-679

7. Porter JC, Kamberi IA, Goldman BD, Mical RS and Grazia YR 1970. The role of substances in the affluent blood supply to the adenohypophysis and in the third ventricular fluid and the release of the luteinizing hormone. *J Reprod Fert* (Suppl) 10:39-49

8. Goldman BD, Grazia YR, Kamberi IA and Porter JC 1971. Serum gonadotropin concentrations in intact and castrated neonatal rats. *Endocrinology* 88:771-776

9. Goldman BD, Mahesh VB and Porter JC 1971. The role of the ovary in control of cyclic LH release in the hamster, *Mesocricetus auratus*. *Biol Reprod* 4:57-65

10. Goldman BD and Gorski RA 1971. Effects of gonadal steroids on the secretion of LH and FSH in neonatal rats. *Endocrinology* 89:112-115

11. Gallo RV, Johnson JH, Goldman BD, Whitmoyer DI and Sawyer CH 1971. Effects of electrochemical stimulation of the ventral hippocampus on hypothalamic electrical activity and pituitary gonadotropin secretion in female rats. *Endocrinology* 89:704-713

12. Goldman BD, Quadagno D, Shryne J and Gorski RA 1972. Modification of phallus development and sexual behavior in rats treated with gonadotropin antiserum neonatally. *Endocrinology* 90:1025-1031

13. Goldman BD and Zarrow MX 1973. The physiology of progestins. In: *Handbook of Physiology*, Endocrinology II, Part 1, pp. 547-572.

14. Goldman BD 1974. The hypothalamic-pituitary-gonadal axis and the regulation of cyclicity and sexual behavior. Neurosciences Research Program, Third Intensive Study Program, MIT Press, Cambridge, MA, pp. 587-591

15. McCullough J, Quadagno DM and Goldman BD 1974. Neonatal gonadal hormones: Effect on maternal and sexual behavior in the male rat. *Physiol Behav* 12:183-188

16. Licht P, Papkoff H, Goldman BD, Follett BK and Scanes CG 1974. Immunological relatedness among reptilian, avian and mammalian pituitary luteinizing hormones. *Gen Comp Endocrinol* 24:168-176

17. Bridges RS, Zarrow MX, Goldman BD and Denenberg VH 1974. A developmental study of maternal responsiveness in the rat. *Physiol Behav* 12:149-151

18. Goldman BD and Sheridan PJ 1974. The ovulatory surge of gonadotropin and sexual receptivity in the female golden hamster. *Physiol Behav* 12:991-995

19. Bridges RS, Goldman BD and Bryant LP 1974. Serum prolactin concentrations and the initiation of maternal behavior in the rat. *Horm Behav* 5:219-226

20. Bridges RS and Goldman BD 1975. Ovarian control of prolactin secretion during late pregnancy in the rat. *Endocrinology* 97:496-498

21. Goldman BD, Bridges RS and Quadagno DM 1975. Sexual Differentiation and patterns of sexual and maternal behavior in the rat: Role of neonatal gonadotropins and gonadal steroids. In: *Sexual Behavior: Pharmacology and Biochemistry*, M. Sandler and G.L. Gessa (eds.), raven Press, New York, pp. 219-226

22. Quadagno DM, Wolfe HG, Ho GKW and Goldman BD 1975. Influence of neonatal castration or neonatal anti-gonadotropin treatment on fertility, phallus development and male sexual behavior in the mouse. *Fertil Steril* 26:939-944

23. Hutchison JS and Goldman BD 1975. The relationship between the rate of testosterone infusion and gonadotropin secretion. *Endocrinology* 97:725-730

24. Bex FJ and Goldman BD 1975. Serum gonadotropins and follicular development in the Syrian hamster. *Endocrinology* 96:928-933

25. Seegal RF and Goldman BD 1975. Effects of photoperiod on cyclicity and serum gonadotropins in the Syrian hamster. *Biol Reprod* 12:223-231

26. Bridges RS and Goldman BD 1975. Diurnal rhythms in gonadotropins and progesterone secretion in lactating and photoperiod induced acyclic hamsters. *Biol Reprod* 13:617-622

27. Bridges RS and Goldman BD 1976. Suckling and LH-induced progesterone secretion in lactating hamsters (*Mesocricetus auratus*). *Neuroendocrinology* 21:20-30

28. Bridges RS, Tamarkin L and Goldman B 1976. Effects of photoperiod and melatonin on reproduction in the Syrian hamster. *Ann Biol Anim Bioch Biophys* 16:339-408

29. Tamarkin L, Westrom WK, Hamill AI and Goldman BD 1976. Effect Of melatonin on the reproductive systems of male and female Syrian hamsters: A diurnal rhythm in sensitivity to melatonin. *Endocrinology* 99:1534-1541

30. Tamarkin L, Hutchison JS and Goldman BD 1976. Regulation of Serum gonadotropins by photoperiod and testicular hormone in the Syrian hamster. *Endocrinology* 99:1528-1533

31. Selmanoff MK, Goldman BD and Ginsburg BE 1977. Developmental changes in serum luteinizing hormone, follicle stimulating hormone and androgen levels in males of two inbred mouse strains. *Endocrinology* 100:122-127

32. Bex FJ and Goldman BD 1977. Serum gonadotropins associated with puberty in the female Syrian hamster. *Biol Reprod* 16:557-560

33. Barkley MS and Goldman BD 1977. A quantitative study of serum testosterone, sex accessory organ growth, and the development of intermale aggression in the mouse. *Horm Behav* 8:208-218

34. Barkley MS and Goldman BD 1977. Testosterone induced aggression In adult female mice. *Horm Behav* 9:76-84

35. Selmanoff MK, Goldman BD, Maxson SC and Ginsburg BE 1977. Correlated effects of the Y-chromosome of mice on developmental changes in testosterone levels and intermale aggression. *Life Sciences* 20:359-366

36. Tamarkin L, Hollister CW, Lefebvre NG and Goldman BD 1977. Melatonin induction of gonadal quiescence in pinealectomized Syrian hamsters. *Science* 198:953-955

37. Tamarkin L, Lefebvre NG, Hollister CW and Goldman BD 1977. Effect of melatonin administered during the night on reproductive function in the Syrian hamster. *Endocrinology* 101:631-634

38. Selmanoff MK, Goldman BD and Ginsburg BE 1977. Serum testosterone, agonistic behavior, and dominance in inbred strains of mice. *Horm Behav* 8:107-119

39. Selmanoff MK, Abreu E, Goldman BD and Ginsburg BE 1977. Manipulation of aggressive behavior in adult DBA2/Bg and C5BL/10/Bg male mice implanted with testosterone in silastic tubing. *Horm Behav* 8:377-390

40. Bartke A, Goldman BD, Bex F and Dalterio S 1977. Effects of prolactin (PRL) on pituitary and testicular function in mice with hereditary PRL deficiency. *Endocrinology* 101:1760-1766

41. Goldman BD 1978. Developmental influences of hormones on neuroendocrine mechanisms of sexual, maternal and aggressive behaviours. In: *Biological Determinants of Sexual Behaviour*, J.B. Hutchison (ed.), John Wiley & Sons, New York, pp. 127-152.

42. Barkley MS and Goldman BD 1978. Studies on opponent status and steroid mediation of aggression in female mice. *Behav Biology* 23:118-123.

43. Erskine MS, Denenberg VH and Goldman BD 1978. Aggression in the lactating rat: Effects of intruder age and test arena. *Behav Biol* 23:52-66.

44. Erskine MS, Barfield RJ and Goldman BD 1978. Intraspecific fighting during late pregnancy and lactation in rats and effects of litter removal. *Behav Biol* 23:206-218.

45. Shander D and Goldman BD 1978. Ovarian steroid modulation of gonadotropin secretion and pituitary responsiveness to luteinizing hormone-releasing hormone in the female hamster. *Endocrinology* 103:1383-1393.

46. Bartke A, Goldman BD, Bex FJ and Dalterio S 1978. Mechanism of reversible loss of reproductive capacity in a seasonally-breeding mammal. *Int J Androl* (Suppl) 2:345-353.

47. Bex F, Bartke A, Goldman BD and Dalterio S 1978. Prolactin, growth hormone, luteinizing hormone receptors, and seasonal changes in testicular activity in the golden hamster. *Endocrinology* 103:2069-2080.

48. Goldman BD, Hall V, Hollister C, Roychoudhury P, Tamarkin L and Westrom W 1979. Effects of melatonin on the reproductive system in intact and pinealectomized male hamsters maintained under various photoperiods. *Endocrinology* 104:82-88.

49. Bittman EL and Goldman BD 1979. Serum levels of gonadotropins in hamsters exposed to short photoperiods: Effects of adrenalectomy and ovariectomy. J *Endocrinol* 83:113-118.

50. Goldman B and Brown S 1979. Sex differences in serum LH and FSH patterns in hamsters exposed to short photoperiod. *J Steroid Biochem* 11:531-535.

51. Bittman EL, Goldman BD and Zucker I 1979. Testicular responses to melatonin are altered by lesions of the suprachiasmatic nuclei in golden hamsters. *Biol Reprod* 21:647-656.

52. Quadagno DM, McGill TE, Yellon SM and Goldman BD 1979. Neither non-contact exposure nor mating affect serum LH and FSH in male $B6D2F_1$ house mice. *Physiol Behav* 22:191-192.

53. Margules DL, Goldman B and Finck A 1979. Hibernation: An opioid-dependent state? *Brain Res Bull* 4:721-724.

54. Goldman BD 1980. Seasonal cycles in testis function in two hamster species: Relation to photoperiod and hibernation. In: Testicular Development, Structure, and Function, A. Steinberger and E. Steinberger (eds.), Raven Press, New York, pp. 401-409.

55. Tamarkin L, Reppert SM, Klein DC, Pratt B and Goldman BD 1980. Studies on the daily pattern of pineal melatonin in the Syrian hamster. Endocrinology 107:1525-1529.

56. Tamarkin L, Reppert SM, Orloff DJ, Klein DC, Yellon SM and Goldman BD 1980. Ontogeny of the pineal melatonin in the Syrian hamster (*Mesocricetus auratus*) and Siberian (*Phodopus sungorus*) hamsters and in the rat. *Endocrinology* 107:1061-1064.

57. Hall V and Goldman B 1980. Effects of gonadal steroid hormones on hibernation in the Turkish hamster (*Mesocricetus brandti*). *J Comp Physiol* 135:107-114.

58. Erskine MS, Barfield RJ and Goldman BD 1980. Postpartum aggression in rats: I. Effects of hypophysectomy. *J Comp Physiol Psychol* 94:484-494.

59. Erskine MS, Barfield RJ and Goldman BD 1980. Postpartum aggression in rats. II. Dependence on maternal sensitivity to young and effects of experience with pregnancy and parturition. *J Comp Physiol Psychol* 94:495-505.

60. Bartke A, Goldman BD, Klemcke HG, Bex FJ and Amador AG 1980. Effects of photoperiod on pituitary and testicular function in seasonally breeding species. In: *Functional Correlates of Hormone Receptors in Reproduction*, V. Mahesh, T. Muldoon, B. Saxena and W. Sadler (eds.), Elsevier, Amsterdam, pp. 171-185.

61. Bartke A, Goldman BD, Bex FJ, Kelch RP, Smith MS, Dalterio S and Doherty PC 1980. Effects of prolactin on testicular regression and recrudescence in the golden hamster. *Endocrinology* 106:167-172.

62. Goldman BD, Matt KS, Roychoudhury P and Stetson MH 1981. Prolactin release in golden hamsters: Photoperiod and gonadal influences. *Biol Reprod* 24:287-292.

63. Goldman B, Hall V, Hollister C, Reppert S, Roychoudhury P, Yellon S and Tamarkin L 1981. Diurnal changes in pineal melatonin content in four rodent species: Relationship to photoperiodism. *Biol Reprod* 24:778-783.

64. Klemcke HG, Bartke A and Goldman BD 1981. Plasma prolactin concentrations and testicular human chorionic gonadotropin binding sites during short photoperiod-induced testicular regression and recrudescence in the golden hamster. *Biol Reprod* 25:536-548.

65. Goldman BD 1981. Structure of protein and peptide hormones. In: *Neuroendocrinology of Reproduction*, N.T. Adler (ed.), Plenum Press, New York, Chap. 1, pp. 3-12.

66. Goldman BD 1981. Histology of the pituitary. In: *Neuroendocrinology of Reproduction*, N.T. Adler (ed.), Plenum Press, New York, Chap. 2, pp. 13-17.

67. Goldman BD 1981. Puberty. In: *Neuroendocrinology of Reproduction*, N.T. Adler (ed.), Plenum Press, New York, Chap. 8, pp. 229-239.

68. Elliott JA and Goldman BD 1981. Seasonal reproduction: *Photoperiodism* and biological clocks. In: *Neuroendocrinology of* Reproduction, N.T. Adler (ed.), Plenum Press, New York, Chap. 12, pp. 377-423.

69. Bartke A, Steger RW, Klemcke HG, Siler-Khodr TM and Goldman BD 1982. Effects of experimentally induced hyperprolactinemia on the hypothalamus, pituitary, and testes in the golden hamster. *J Androl* 3:172-177.

70. Hall VD, Bartke A and Goldman BD 1982. Role of the testes in regulating the duration of hibernation in the Turkish hamster, *Mesocricetus brandti*. *Biol Reprod* 27:802-810.

71. Carter DS, Hall VD, Tamarkin L and Goldman BD 1982. Pineal is required for testicular maintenance in the Turkish hamster (*Mesocricetus brandti*). *Endocrinology* 111:863-871.

72. Steger RW, Bartke A and Goldman BD 1982. Alterations in neuroendocrine function during photoperiod induced testicular atrophy and recrudescence in the golden hamster. *Biol Reprod* 26:437-444.

73. Hall VD and Goldman BD 1982. Hibernation in the female Turkish hamster (Mesocricetus brandti): An investigation of the role of the ovaries and of photoperiod. *Biol Reprod* 27:811-815.

74. Yellon SM, Tamarkin L, Pratt BL and Goldman BD 1982. Pineal melatonin in the Djungarian hamster: Photoperiodic regulation of a circadian rhythm. *Endocrinology* 111:488-492.

75. Goldman BD, Carter DS, Hall VD, Roychoudhury P and Yellon SM 1982. Physiology of pineal melatonin in three hamster species. In: *Melatonin Rhythm Generating System*, D.C. Klein (ed.), Karger, Basel, pp. 210-231.

76. Goldman BD 1983. The physiology of melatonin in mammals. In: *Pineal Research Reviews*, Vol. 1, R.J. Reiter (ed.), Alan R. Liss, pp. 145-182.

77. Bartke A, Klemcke HG, Amador A, Goldman BD and Siler-Khodr TM 1983. Relationship of the length of exposure to short photoperiod to the effect of prolactin on pituitary and testicular function in the golden hamster. *J Reprod Fertil* 69:587-595.

78. Carter DS and Goldman BD 1983. Antigonadal effects of timed melatonin infusion in pinealectomized male Djungarian hamsters (Phodopus sungorus sungorus): duration is the critical parameter. *Endocrinology* 113:1261-1267.

79. Carter DS and Goldman BD 1983. Progonadal role of the pineal in the Djungarian hamster (Phodopus sungorus sungorus): mediation by melatonin. *Endocrinology* 113:1268-1273.

80. Albers HE, Carter DS, Darrow JM and Goldman BD 1983. Circadian organization of locomotor activity in the Turkish hamster (Mesocricetus brandti). *Behav Neurobiol* 37:362-366.

81. Steger RW, Bartke A, Goldman BD, Soares MJ and Talamantes F 1983. Effects of short photoperiod on the ability of golden hamster pituitaries to secrete prolactin and gonadotropins *in vitro*. *Biol Reprod* 29:872-878.

82. Goldman BD and Darrow JM 1983. Pineal gland and mammalian photoperiodism. *Neuroendocrinology* 37:386-396.

83. Yellon SM and Goldman BD 1984. Photoperiod control of reproductive development in the male Djungarian hamster (*Phodopus sungorus*). *Endocrinology* 114:664-670.

84. Carillo AJ, Goldman BD and Bartke A 1984. Hypothalamic deafferentation inhibits the stimulatory influence of prolactin on follicle-stimulating hormone release in the golden hamster. *Endocrinology* 114:87-91.

85. Goldman BD, Darrow JM and Yogev L 1984. Effects of timed melatonin infusions on reproductive development in the Djungarian hamster *Phodopus sungorus*). *Endocrinology* 114:2074-2083.

86. Duncan MJ and Goldman BD 1984. Hormonal regulation of the annual pelage color cycle in the Djungarian hamster, *Phodopus sungorus*. I. Role of the gonads and the pituitary. *J Exptl Zool* 230:89-95.

87. Duncan MJ and Goldman BD 1984. Hormonal regulation of the annual pelage color cycle in the Djungarian hamster, *Phodopus sungorus*. II. Role of prolactin. *J Exptl Zool* 230:97-103.

88. Albers HE, Ferris CF, Leeman SE and Goldman BD 1984. Avian pancreatic polypeptide phase shifts hamster circadian rhythms when microinjected into the suprachiasmatic region. *Science* 223:833-835.

89. Ferris CF, Albers HE, Wesolowski SM, Goldman BD and Leeman SE 1984. Vasopressin injected into the hypothalamus triggers a stereotypic behavior in golden hamsters. *Science* 224:521-523.

90. Bartke A, Matt KS, Siler-Khodr TM, Soares MJ, Talamantes F, Goldman BD, Hogan MP and Herbert A 1984. Does prolactin modify testosterone feedback in the hamster? Pituitary grafts alter the ability of testosterone to suppress luteinizing hormone and follicle-stimulating hormone release in castrated male hamsters. *Endocrinology* 115:1506-1510.

91. Macrides F, Singer AG, Clancy AN, Goldman BD and Agosta WC 1984. Male hamster investigatory and copulatory responses to vaginal discharge: Relationship to the endocrine status of females. *Physiol Behav* 33:633-637.

92. Duncan MJ, Goldman BD, DiPinto MN and Stetson MH 1984. Testicular function and pelage color have different critical daylengths in the Djungarian hamster, *Phodopus sungorus sungorus*. *Endocrinology* 116:424-430.

93. Duncan MJ and Goldman BD 1985. Physiological doses of prolactin stimulate pelage pigmentation in Djungarian hamster. *Am J Physiol* 248:R664-R667.

94. Yellon SM, Tamarkin L and Goldman BD 1985. Maturation of the pineal melatonin rhythm in long- and short-day reared Djungarian hamsters. *Experientia* 41:651-652.

95. Albers HE, Yogev L, Todd RB and Goldman BD 1985. Adrenal corticoids in hamsters: role in circadian timing. *Am J Physiol* 248:R434-R438.

96. Vitale PM, Darrow JM, Duncan MJ, Shustak CA and Goldman BD 1985. Effects of photoperiod, pinealectomy and castration on body weight and daily torpor in Djungarian hamsters (*Phodopus sungorus*). *J Endocrinol* 106:367-375.

97. Reppert SM, Duncan MJ and Goldman BD 1985. Photic influences on the developing mammal. In: *Proceedings of the Ciba Foundation on Melatonin and the Pineal Gland*, Pitman, London, pp. 116-128.

98. Darrow JM and Goldman BD 1986. Circadian regulation of pineal melatonin and reproduction in the Djungarian hamster. *J Biol Rhythms* 1:39-54.

99. Pratt BL and Goldman BD 1986. Activity rhythms and photoperiodism of Syrian hamsters in a simulated burrow system. *Physiol Behav* 36:83-89.

100. Pratt BL and Goldman BD 1986. Environmental influences upon circadian periodicity in Syrian hamsters. *Physiol Behav* 36:91-95.

101. Pratt BL and Goldman BD 1986. Maternal influence on activity rhythms and reproductive development in Djungarian hamster pups. *Biol Reprod* 34:655-663.

102. Stetson MH, Elliott JA and Goldman BD 1986. Maternal transfer of photoperiodic information influences the photoperiodic response of prepubertal Djungarian hamsters (*Phodopus sungorus sungorus*). *Biol Reprod* 34:664-669.

103. Darrow JM, Tamarkin L, Duncan MJ and Goldman BD 1986. Pineal melatonin rhythms in female Turkish hamsters: Effects of photoperiod and hibernation. *Biol Reprod* 35:74-83.

104. Goldman BD, Darrow JM, Duncan MJ and Yogev L 1986. Photoperiod, reproductive hormones and winter torpor in three hamster species. In: *Living in the Cold*, H.C. Heller, X.J. Musacchia and L.C.H. Wang (eds.), Elsevier, New York, pp. 341-350.

105. Newcomber CE, Fitts DA, Goldman BD, Murphy MR, Rao GN, Shklar G and Schwartz JL 1987. Experimental biology: Other research uses of Syrian hamsters. In: *Laboratory Hamsters*, G.L. Van Hoosier and C.W. McPherson (eds.), Academic Press, Inc., New York, Chap 16. Pp. 263-299.

106. Darrow JM, Yogev L and Goldman BD 1987. Patterns of reproductive hormone secretion in hibernating Turkish hamsters. *Am J Physiol* 253:R329-R336.

107. Goldman BD and Darrow JM 1987. Influence of short days on hibernation in castrated Turkish hamsters. *Am J Physiol* 253:R337-R343.

108. Yellon SM and Goldman BD 1987. Influence of short days on diurnal patterns of serum gonadotrophins and prolactin concentrations in the male Djungarian hamster, Phodopus sungorus. *J Reprod Fertil* 80:1670174.

109. Bartness TJ, Wade GN and Goldman BD 1987. Are the short-photoperiod-induced decreases in serum prolactin responsible for the seasonal changes in energy balance in Syrian and Siberian hamsters? *J Exp Zool* 244:437-454.

110. Underwood H and Goldman BD 1987. Vertebrate circadian and photoperiodic systems: Role of the pineal gland and melatonin. *J Biol Rhythms* 2:279-315.

111. Goldman BD and Elliott JA 1988. Photoperiodism and seasonality in hamsters: Role of the pineal gland. In: Processing of Environmental Information in Vertebrates, M.H. Stetson (ed.), Springer-Verlag, New York, Chap. 10, pp. 203-218.

112. Okulicz WC, Darrow JM and Goldman BD 1988. Uterine steroid hormone receptors during the estrous cycle and during hibernation in the Turkish hamster (*Mesocricetus brandti*). *Biol Reprod* 38:597-604.

113. Clemens LG, Wee BEF, Weaver DR, Roy EL, Goldman BD and Rakerd B 1988. Retention of masculine sexual behavior following castration in male B6D2F1 mice. *Physiol Behav* 42:69-76.

114. Darrow JM, Duncan MJ, Bartke A, Bona-Gallo A and Goldman BD 1988. Influence of gonadal steroids on hibernation in the European hamster. *J Comp Physiol* A 163:339-348.

115. Bartness TJ and Goldman BD 1988. Peak duration of serum melatonin and short-day responses in adult Siberian hamsters. *Am J Physiol* 255:R812-R822.

116. Bartness TJ and Goldman BD 1988. Effects of melatonin on long-day responses in short-day housed adult Siberian hamsters. *Am J Physiol* 255:R823-R830.

117. Goldman BD 1989. Effects of photoperiod on the hibernation cycle of the Turkish hamster. In: *Living in the Cold, 2nd International Symposium*, A. Milan and B. Canguilhem (eds.), John Libbey, London, pp. 5-14.

118. Elliott JA and Goldman BD 1989. Reception of photoperiodic information by fetal Siberian hamsters: role of the mother’s pineal gland. *J Exp Zool* 252:237-244.

119. Bartness TJ, Hamilton JM, Wade GN and Goldman BD 1989. Regional differences in fat pad responses to short days in Siberian hamsters. *Am J Physiol* 257:R1533-R1540.

120. Bartness TJ, Elliott JA and Goldman BD 1989. Control of torpor and body weight patterns by a seasonal timer in Siberian hamsters. *Am J Physiol* 257:R142-R149.

121. Elliott JA, Bartness TJ and Goldman BD 1989. Effect of melatonin infusion duration and frequency on gonad, lipid and body mass in pinealectomized male Siberian hamsters. *J Biol Rhythms* 4:439-455.

122. Bartness TJ and Goldman BD 1989. Mammalian pineal melatonin: A clock for all seasons. *Experientia* 45:939-945.

123. Goldman BD 1989. Photoperiodic control of puberty in hamsters. In: *Development of Circadian Rhythmicity and Photoperiodism in Mammals*, S.M. Reppert (ed.), Perinatology Press, Ithaca, NY, Chap. 8, pp. 193-207.

124. Yellon SM, Hutchison JS and Goldman BD 1989. Sexual differentiation of the steroid feedback mechanism regulating follicle-stimulating hormone secretion in the Syrian hamster. *Biol Reprod* 40:7-14.

125. Nelson RJ, Badura LL and Goldman BD 1990. Mechanisms of seasonal cycles of behavior. *Annu Rev Psychol* 41:81-108.

126. Bartness TJ, Goldman BD and Bittman EL 1990. SCN lesions block the reception of melatonin daylength signals in Siberian hamsters. *Am J Physiol* 260:R102-R112.

127. Bittman EL, Bartness TJ, Goldman BD and DeVries GJ 1990. Suprachiasmatic and paraventricular control of photoperiodism in Siberian hamsters. *Am J Physiol* 260:R90-R101.

128. Rado R, Gev H, Goldman BD and Terkel J 1991. Light and circadian activity in the blind mole rat. In: E. Rilkis (ed.), Plenum Press, New York, pp. 581-588.

129. Goldman BD 1991. Parameters of the circadian rhythm of pineal melatonin secretion affecting reproductive responses in Siberian hamsters. *Steroids* 56:218-225.

130. Badura LL and Goldman BD 1992. Prolactin-dependent seasonal changes in pelage: Role of the pineal gland and dopamine. *J Exp Zool* 261:27-33.

131. Badura LL and Goldman BD 1992. Seasonal regulation of neuroendocrine activity in male Turkish hamsters (*Mesocricetus brandti*): Role of the hypothalamic paraventricular nucleus. *Neuroendocrinology* 55:477-484.

132. Badura LL and Goldman BD 1992. Central sites mediating reproductive responses to melatonin in juvenile male Siberian hamsters. *Brain Res* 598:98-106.

133. Bartness TJ, Powers JB, Hastings MH, Bittman EL and Goldman BD 1993. The timed infusion paradigm for melatonin delivery: What has it taught us about the melatonin signal, its reception, and the photoperiodic control of seasonal responses? *J Pineal Res* 15:161-190.

134. Bartness TJ, Hall ES, Trayhurn P and Goldman BD 1993. Diet affects hibernation in Turkish hamsters. In: *Living in the Cold: Ecological, Physiological and Molecular Mechanisms*, C. Carey, G.L. Florant, B.A. Wunder and B. Horwitz (eds.), Westview Press, Boulder, CO, pp. 185-192.

135. Goldman BD and Nelson RJ 1993. Melatonin and seasonality in mammals. In: *Melatonin: Biosynthesis, Physiological Effects, and* Clinical Applications, H.-S. Yu and R.J. Reiter (eds.), CRC Press, Boca Raton, pp. 225-252.

136. Badura LL and Goldman BD 1994. Prolactin secretion in female Siberian hamsters following hypothalamic deafferentation: Role of photoperiod and dopamine. *Neuroendocrinology* 59:49-56.

137. Kelly KK, Goldman BD and Zucker I 1994. Gonadal growth and hormone concentrations in photoregressed Siberian hamsters: Pinealectomy versus photostimulation. *Biol Reprod* 51:1046-1050.

138. Nelson RJ, Moffatt Ca and Goldman BD 1994. Reproductive and nonreproductive responsiveness to photoperiod in laboratory rats. *J Pineal Res* 17:123-131.

139. Shaw D and Goldman BD 1995. Influence of prenatal photoperiods on critical day lengths for postnatal testis development in the Siberian hamster (*Phodopus sungorus sungorus*). *Biol Reprod* 52:833-838.

140. Shaw D and Goldman BD 1995. Influence of prenatal photoperiods on postnatal reproductive responses to daily infusions of melatonin in the Siberian hamster (*Phodopus sungorus sungorus*). *Endocrinology* 136:4231-4236.

141. Shaw D and Goldman BD 1995. Gender differences in influence of prenatal photoperiods on postnatal pineal melatonin rhythms and serum PRL and FSH in the Siberian hamster (*Phodopus sungorus sungorus*). *Endocrinology* 136:4237-4246.

142. Freeman DA and Goldman BD 1997. Evidence that the circadian system mediates photoperiodic nonresponsiveness in Siberian hamsters: The effect of running wheel access on photoperiodic responsiveness. *J Biol Rhythms* 12:100-109.

143. Freeman DA and Goldman BD 1997. Photoperiod nonresponsive Siberian hamsters: Effect of age on the probability of nonresponsiveness. *J Biol Rhythms* 12:110-121.

144. Goldman BD, Goldman SL, Riccio AP and Terkel J 1997. Circadian patterns of locomotor activity and body temperature in blind mole-rats, Spalax ehrenbergi. *J Biol Rhythms* 12:348-361.

144. Badura LL and Goldman BD 1997. Anterior pituitary release of prolactin is inhibited by exposure to short photoperiod. J *Neuroendocrinol* 9:341-345.

145. Freeman DA and Goldman BD 1999. Cricetidae (Hamsters and Lemmings). In: *Encyclopedia of Reproduction*, Vol. 1, E. Knobil and J. Neill (eds.), Academic Press, pp. 739-748.

146. Goldman BD, Goldman SL, Lanz T, Magaurin A and Maurice A 1999. Factors influencing metabolic rate in naked mole-rats (*Heterocephalus glaber*). *Physiol Behav* 66:447-459.

147. Goldman BD 1999. The circadian timing system and reproduction in mammals. *Steroids* 64:679-685.

148. Goldman BD 2000. The Siberian hamster as a model for study of the mammalian photoperiodic mechanism. In: Melatonin After Four Decades: An Assessment of Its Potential, Volume 460, *Adv Exp Biol Med*, J. Olcese (ed.), Plenum Publishers, New York, Chap.17, pp. 155-164.

150. Riccio AP and Goldman BD (2000). Circadian rhythms of locomotor activity in naked mole-rats (*Heterocephalus glaber*), *Physiol. Behav*. 71:1-13.

151. Riccio AP and Goldman BD (2000). Circadian rhythms of body temperature and metabolic rate in naked mole-rats, *Physiol. Behav*., 71:15-22.

152. Goldman SL, Dhandapani K and Goldman BD (2000). Genetic and environmental influences on short-day responsiveness in Siberian hamsters (*Phodopus sungorus*). *J. Biol. Rhythms* 15:417-428.

153. Goldman BD (2001). Mammalian photoperiodic system: Formal properties and neuroendocrine mechanisms of photoperiodic time measurement. *J. Biol. Rhythms* 16:283-301.

154. Gorman MR, Goldman BD and Zucker I 2001. Mammalian photoperiodism. In: Circadian Clocks, *Handbook of Behavioral Neurobiology*, vol. 12, JS Takahashi, FW Turek and RY Moore (eds.), Plenum Press, NY, pp.481-508.

155. Peroulakis ME, Goldman B and Forger NG 2002. Perineal muscles and motoneurons are sexually monomorphic in the naked mole-rat *Heterocephalus glaber*). *J. Neurobiol.* 51:33-42.

156. Goldman BD et al. (2003). Circannual Rhythms and Photoperiodism. In: Chronobiology: Biological Timekeeping, JC Dunlap, JJ Loros, PJ DeCoursey (eds.), Sinauer Associates, Inc., Sunderland, MA, Chap. 4, pp.104-1142.

157. Goldman BD (2003). Pattern of melatonin secretion mediates transfer of photoperiod information from mother to fetus in mammals. *Sci. STKE,* Vol. 2003, Issue 192, pp. pe29, 22 July 2003

158. Freeman DA, Dhandepani D and Goldman BD 2004. The thalamic intergeniculate leaflet modulates photoperiod responsiveness in Siberian hamsters. *Brain Research* 1028:31-38.

159. Freeman DA, Teubner BJ and Goldman BD 2006. The thalamic intergeniculate leaflet mediates locomotor activity-induced reversal of phenotype in photoperiod nonresponsive Siberian hamsters. *J Biol Rhythms*. 21:206-213.

160. Seney M, Goldman BD and Forger NG 2006. Breeding status affects motoneurons number and muscle size in naked mole-rats: Recruitment of perineal motoneurons? *J Neurobiol* 66:1354-1364.

161. Goldman SL, Forger NG and Goldman BD 2006. Influence of gonadal sex hormones on behavioral components of the reproductive hierarchy in naked mole-rats. *Horm Behav* 50:77-84.

162. Rosen GJ, De Vries GJ, Goldman SL, Goldman BD and Forger NG 2007. Distribution of vasopressin in the brain of the Eusocial naked mole-rat. *J Comp Neurol* 500:1093-1105.

163. Holmes MM, Rosen GJ, Jordan CL, de Vries GJ, Goldman BD and Forger NG 2007. Social control of brain morphology in a eusocial mammal. *PNAS* 104:10548-10552.

164. Holmes MM, Goldman BD, Goldman SL, Seney ML, Forger NG 2009. Neuroendocrinology and sexual differentiation in eusocial mammals. *Frontiers in Neuroendocrinology* 30:519-533.

165. Seney ML, Kelly DA, Goldman BD; Sumbera R, Forger NG 2010. Social structure predicts genital morphology in African mole-rats. *PloS* 2009;4(10):e7477.

166. Holmes M, Seney ML, Goldman BD and Forger NG 2011. Social and hormonal triggers of neural plasticity in naked mole-rats. *Behav Brain Res* 218:234-239.

167. Anyan JJ, Seney ML, Holley A, Bengston L, Goldman BD, Forger NG and Holmes MM 2011. Social status and sex effects on neural morphology in Damaraland mole-rats, *Fukomys damarensis. Brain Behav Evol* 77:291-298.

168. Sura R, French RA, Goldman BD and Schwartz DR 2011. Neoplasia and granulomas surrounding microchip transponders in Damaraland mole rats (*Cryptomys damarensis*). *Vet Pathol* 48:896-902.

169. Carter SN, Goldman BD, Goldman SL and Freeman DA 2014. Social cues elicit sexual behavior in subordinate Damaraland mole-rats independent of gonadal status. *Horm Behav* 65:14-21.

Previous Extramural Grants Awarded:

Reproductive Hierarchy and Sexual Differentiation, NSF, 4/1/04–3/31/07, $50,201 direct costs for 2004-05.

Neural Sites of Melatonin Action and Biological Rhythms, NIMH, 6/1/94-5/31/00, $297,578 direct costs

Neuroendocrine Factors in Hibernation, NSF, 3/1/91-8/31/95, $184,085 direct costs

Endocrine Regulation of Annual Pelage Cycle, PHS, 2/1/86-1/31/89, $264,461 direct costs (This award was initiated while the PI was at the Worcester Foundation. It was transferred to the University of Connecticut in 1987.)

Environmental and Hormonal Factors in Hibernation, PHS, 1/1/83–12/31/87 (This award was initiated while the PI was at the Worcester Foundation. It was transferred to the University of Connecticut in 1987.)

Photoperiodic Regulation of Mammalian Reproduction, PHS, 4/1/86-3/31/91, $598,522 (This award was initiated while the PI was at the Worcester Foundation. It was transferred to the University of Connecticut in 1987.)

Photoperiodic Regulation of Mammalian Reproduction, PHS, 4/1/81-3/31/86, $321,718 direct costs

Environmental and Hormonal Factors in Hibernation, PHS, 1/1/80-12/31/82, $169,841 direct costs

Photoperiodic Regulation of Mammalian Reproduction, PHS, 9/1/77-8/31/81

Environmental and Hormonal Factors in Hibernation, PHS, 10/1/76-9/30/79, $90,735 direct costs

Control of Pituitary and Gonadal Hormone Secretion, PHS, 1/1/71-12/31/73, $96,665 direct costs

National Review Boards:

Endocrinology Study Section, NIH (1975/79)
Biopsychology Study Section, NIH (1983/87)

Editorships (current):

Editorial Board, Journal of Pineal Research
Editorial Board, Journal of Biological Rhythms (2001-current)

Editorships (past):

Editorial Board, American Journal of Physiology

Associate Editor, Journal of Biological Rhythms (1985-1994)
Editorial Board, Hormones and Behavior (1986-1996)
Editorial Board, Neuroendocrinology

Courses taught:

Biological Rhythms (PNB 225/325)
Hormones and Behavior (PNB 230/330)
Topics in Modern Biology (Biol 196)
Foundations of Biology (Biol 107)
Comparative Endocrinology (PNB 421, with Drs. Nancy Clark and David Borst)
Comparative Endocrinology Laboratory (PNB 422)
Behavioral Endocrinology (EEB 297)
Animal Models and Human Evolution (EEB 210)

Research of Bruce D. Goldman

The following areas of research have been studied in the laboratory of Bruce Goldman. Following a description of each area is a list of the related publication numbers, as listed in my Curriculum Vitae:

1) Patterns of secretion of pituitary gonadotropins and their role in ovulation in rats and Syrian hamsters (Ph.D. dissertation; publications 1-4,6,7,9,11,14,24,32,45)

   Serum concentrations of both LH and FSH increase sharply a few hours prior to ovulation in rats and hamsters. Injections of either of these hormones induced ovulation in females with mature ovarian follicles. Treatment of females with antibodies formed against FSH and LH, respectively, revealed that both hormones are released in quantities that are adequate to trigger ovulation.

   I also examined the role of FSH in the early recruitment of ovarian follicles. My studies supported the importance of a transient rise in plasma FSH concentration for triggering the process of follicular maturation that ultimately culminates with ovulation.

2) Role of pituitary and testicular hormones in sexual differentiation during neonatal life in rats; serum concentrations of gonadotropins in neonatal rats (Ph.D. dissertation; publications 5,8,10,12,15,21,22,41,124)

   It has been very clearly established that testis hormones (androgens) are essential to masculinization of a number of physiological and behavioral systems during mammalian development. In many rodents, sexual differentiation of these systems occurs at about the time of birth. Our studies revealed that the neonatal rat testis is under regulation by pituitary gonadotropins (FSH and LH). Treatment of neonatal male rats with antisera to FSH and LH resulted in partial blockade of masculinization, an effect that persisted into adulthood. We verified for the first time that neonatal rats actively secrete FSH and LH. Serum concentrations of these hormones are higher in newborn females as compared to males. Serum FSH and LH concentrations increased following castration in neonatal males, and levels of these hormones were decreased when the neonates were treated with androgen or estrogen.

3) Hormones and maternal behavior in rats (publications 17,19,20,27)

4) Secretion patterns and regulation of pituitary gonadotropin secretion and testicular androgen secretion in male rats and mice (publications 23,31,52,113)

5) Hormones and aggression in rats and mice (publications 33,35,38,39,42-44,58,59)

6) Hormones, pheromones and sexual behaviors in Syrian hamsters (publications 18,91)

7) Role of photoperiod, the pineal gland, and melatonin in the regulation of seasonal changes in reproduction in Syrian hamsters, Turkish hamsters, Siberian hamsters, and laboratory rats (publications 25,26,28-30,36,37,46-51,54-56,60-64,68,71,72,74-79,81-33,85,94,98,99,103,108,111,115,116,121-123,125-127,129,131-133,135-138,142,143,145,146,148,149,152-154,156,158,159)

My laboratory was involved in the study of pineal function and photoperiodism in mammals for approximately 24 years. We were the first group to report that timed daily injections of the pineal hormone, melatonin (MEL), could 'mimic' several of the actions of short day lengths on the reproductive system in pineal-intact Syrian hamsters. We also reported that multiple daily injections of MEL could product the same effects in pinealectomized hamsters. These observations provided the first strong evidence that MEL is the pineal hormone involved in photoperiodic regulation of reproduction. By extending our studies of pineal physiology to several other mammal species, we and others have demonstrated that MEL is involved in the seasonal (photoperiodic) regulation of numerous functions in addition to reproductive activity. For example, in Siberian hamsters, photoperiod-driven changes in MEL secretion are central to the seasonal changes in pelage, lipid metabolism, body weight, and thermoregulation.

By carrying out a series of studies employing the paradigm of timed daily infusions of MEL in pinealectomized hamsters, we were the first to demonstrate the specific nature of the 'photoperiod signal'. These experiments revealed the overriding importance of the duration of each (circadian) episode of MEL. Additional studies revealed the fundamental importance of day length, acting through the circadian system, in regulating the duration of nightly episodes of MEL biosynthesis/secretion. Other laboratories have confirmed this model of pineal MEL function in various species, including sheep, mink, ferrets, mice, deer, and wallabies.

Later studies in my laboratory revealed that MEL acts in at least three separate brain sites to exert its actions on the hamster reproductive system. We also showed that for Siberian hamsters, individual variations in response to photoperiod are a function of differences in properties of the circadian system. These variations have a heritable basis, but they are also subject to major environmental influence; thus, major changes in photoresponsiveness can occur during an individual's life history.

8) Gonadal hormones, hibernation, and daily torpor in Turkish hamsters, European hamsters, and Siberian hamsters (publications 53,57,70,73,96,104,106,107,112,114,117,120,134)

During approximately 19 years of study, my laboratory examined relationships between reproductive hormones and winter torpor (hibernation and daily torpor) in three species of hamsters. These studies revealed that increased levels of testosterone abruptly terminate torpor. We proposed that this endocrine mechanism might serve to help coordinate the end of the hibernation season with the seasonal onset of reproduction. Thus, hibernation will be terminated just as the testes begin to exhibit endocrine activity, assuring that males will become reproductively competent soon after *emergence from hibernation. In support of this hypothesis, we observed that castrated male hamsters remained in hibernation for several weeks beyond the time when hibernation had terminated in testis-intact males. We also reported that seasonal patterns of hormone secretions (FSH, LH, prolactin, testosterone) are expressed in hibernating hamsters similarly to the patterns seen in individuals that are not allowed to hibernate; thus, seasonal timing mechanisms are not seriously disrupted during hibernation.*

9) Role of photoperiod, melatonin, and prolactin in seasonal pelage changes and in lipid metabolism in Siberian hamsters (publications 86,87,92,93,109,119)

   Many Temperate Zone mammals exhibit seasonal pelage changes, typically with a fall molt to a strongly insulating pelage and a spring molt to return to a summer coat. Studies in my laboratory, using Siberian hamsters, revealed that the type of fur produced following a molt (summer or winter fur) is determined by the circulating concentration of prolactin. High levels of prolactin---typically in effect during the summer (long day lengths) result in growth of a summer coat, whereas low levels of prolactin (short day lengths) lead to the growth of winter pelage. In other laboratories, this mechanism has been confirmed for several other species, including fox, deer, and mink.

10) Role of prolactin in regulation of testis function in Syrian hamsters and mice (publications 40,69,84,90,130)

11) Transfer of photoperiod information from mother to fetus in Siberian hamsters (publications 97,102,118,139-141,157)

    The photoperiod in effect during gestation influences the photoperiod responsiveness of hamster pups, as exhibited beginning at about two weeks postpartum. Our studies revealed that a 'photoperiod message' is transmitted by the mother to her fetuses. This message is provided in the form of the mother's rhythm of pineal MEL secretion.

    We also investigated the mechanism by which the maternal MEL rhythm alters photoperiod responses of her offspring. Our data indicate that the pineal MEL rhythms of 2-week-old hamsters were differentially affected by the photoperiods experienced by their mothers (and the mothers' corresponding MEL rhythms) during gestation. Interestingly, this influence of the mother was observed only in male, and not in female, pups.

12) Circadian rhythms: influence of environmental factors, maternal influence, endocrine influences---hamsters and mole-rats (publications 80,88,95,100,101,110,128,144,150,151)

    My laboratory has carried out several studies examining the physiology of the circadian system in mammals. Most recently, we have been the only laboratory to carry out systematic studies of circadian function in subterranean mammals. The subjects for these studies have been two species that are almost exclusively *fossorial---the blind mole-rat and the naked mole-rat. Both species exhibit circadian rhythms of locomotor activity and body temperature that are entrainable by light cues.*

13) Sexual differences and sexual differentiation in naked mole-rats and Damaraland mole-rats (publications 155, 160-169)

In collaboration with Drs. Nancy Forger and Geert DeVries (University of Massachusetts, Amherst) I am studying sex differences in behavior and the nervous system in naked mole-rats. This eusocial species exhibits an absence of sex differences in several features that are sexually different in most other mammals; perhaps most notably, there is no sex difference in cell numbers or cell size in Onuf's nucleus of the spinal cord (homologous to the spinal nucleus of the bulbocavernosus) or in the major perineal muscles. We have proposed that the decreased degree of sex difference in this species may have evolved in conjunction with the social/reproductive structure of naked mole-rats, with only one breeding female and 1-3 breeding males in each colony (typical colony size of 60-80 individuals). We will pursue this research in naked mole-rats and in closely related species that show different degrees of reproductive skew, ranging from species that are similarly eusocial but with smaller colony sizes to species.

Our most recent research in a second eusocial rodent, the Damaraland mole-rat, has demonstrated that both sexes continue to exhibit sex behaviors (mounting by males, solicitation and lordosis by females) for at least several months after gonadectomy. Preliminary results suggest that sex behaviors are exhibited post-gonadectomy even by individuals that had no sexual experience before surgery.