

## **CURRICULUM VITAE**

(Updated 10/01/17)

### **RICHARD L. BOWEN, M.D.**

217 Calhoun St.

Charleston, SC 29401

richard.bowen@yahoo.com

#### **EDUCATION:**

1979 BS University of South Carolina, Columbia, S.C.

1985 M.D. Medical University of South Carolina, Charleston, S.C.

1988 Family Medicine Residency, Spartanburg Regional Medical Center, S.C.

#### **BOARD CERTIFICATION:**

American Board of Family Medicine 1988

Recertification 2013

#### **PRACTICE/EMPLOYMENT HISTORY:**

**03-14 to present Patiently, LLC**

**07-11 to 01-15 Health First Charleston, SC**

**01-10 to 6-11 Duke Primary Care**

**11-08 to 01-10 Clinical Physician Next Care Garner**

**08-07 to 11-08 Clinical Physician Health First Urgent Care**

**01-07 to 08-07 Medical Director Bonita Urgent Care**

**03-01 to 12-05**

**Founder & Chief Medical Officer, Voyager Pharmaceutical Corp.**

**04-95 to 03-01**

**Outpatient practice specializing in the treatment of metabolic syndrome and diabetes**

**07-91 to 04-95**

**Hospital Based Family Practice**

**10-89 to 7-91**

**Naples Community & North Collier Hospital Emergency Dept Physician**

**07-88 to 10-89**

**Brooksville Regional Medical Center, Emergency Dept. Physician**

**POSITIONS HELD:**

7/15 to 7/17 Clinical Assistant Professor, Dept. of Psychiatry, MUSC

7/93-7/94 Chairman Critical Care Committee N. Collier Hospital

7/94-4/95 Vice Chairman Department of Medicine, N. Collier Hospital

7/90-4/95 Medical Director Bentley Village Skilled Nursing Facility

**Full Length Papers:**

1. **Bowen RL**, Glicklich A, Kahn M, et al. (1997) "Cardiac valvulopathy associated with exposure to fenfluramine or dexfenfluramine: U.S. Department of Health and Human Services Interim Public Health Recommendations", *MMWR*;46: 1061-6
2. **Bowen RL**, Foreyt JP, Poston WSC, Miller, C.C., Hyman, D., Pendleton, V.R., Gangopadhyay, S., Hakkock, C.K., Goodrick, G.K., & Lehbar, S. (1999). "Echocardiographic assessment of Patients receiving Long-Term Treatment with Anorexiant Medications": *Endocrine Practice*, 5, 17-23.
3. **Bowen RL**, Isley J, Atkinson RL (2000) "An Association of Elevated Serum Gonadotropin Concentrations and Alzheimer Disease?" *Journal of Neuroendocrinology*, Vol. 12 (4):351-354
4. Zhu, X., McShea, A., Harris, P.L.R., Raina, A.K., Castellani, R.J., Funk, J.O., Shah, S., Atwood, C., **Bowen, R.**, Bowser, R., Morelli, L., Perry, G. and Smith, M.A. (2004) Elevated expression of a regulator of the G2/M phase of the cell cycle, neuronal CIP-1-associated regulator of cyclin B, in Alzheimer's disease. *J. Neurosci. Res.*, 75, 698-703
5. **Bowen, R.L.**, Verdile, G., Liu, T., Parlow, A.F., Perry, G., Smith, M.A., Martins, R.N. and Atwood, C.S. (2004) Luteinizing hormone, a reproductive regulator that modulates the processing of amyloid- $\beta$  precursor protein and amyloid- $\beta$  deposition. *J. Biol. Chem.*, 279, 20539-20545.
6. **Bowen RL**, Atwood CS. Living and dying for sex. A theory of aging based on the modulation of cell cycle signaling by reproductive hormones. *Gerontology*. 2004 Sep-Oct;50(5):265-90.

7. Casadesus, G., Webber, K.M., Atwood, C.S., Pappolla, M.A., Perry, G., **Bowen, R.L.** and Smith, M.A. (2006) Luteinizing hormone modulates cognition and amyloid- $\beta$  deposition in Alzheimer APP transgenic mice. *Biochim. Biophys. Acta*, 1762, 447-452.
8. Webber, K.M., Stocco, D.M., Casadesus, G., **Bowen, R.L.**, Atwood, C.S., Preville, L.A., Harris, P.L.R., Zhu, X., Perry, G. and Smith, M.A. (2006) Steroidogenic acute regulatory protein (StAR): evidence of gonadotropin-induced steroidogenesis in Alzheimer disease. *Mol. Neurodegener.*, 1, 14.
9. Casadesus, G., Milliken, E.L., Webber, K.M., **Bowen, R.L.**, Lei, Z., Rao, C.V., Perry, G., Keri, R.A. and Smith, M.A. (2007) Increases in luteinizing hormone are associated with declines in cognitive performance. *Mol. Cell. Endocrinol.*, 269, 107-111.
10. Atwood, C.S. and **Bowen, R.L.** (2006). Metabolic clues regarding the enhanced performance of elite endurance athletes from orchietomy-induced hormonal changes. *Medical Hypotheses*, 68(4), 735-749. (Epub 2006 Nov 13).
11. Vadakkadath Meethal, S., Gallego, M., Haasl, R.J., Petras, S.J., Sgro, J.Y., **Bowen, R.L.** and Atwood, C.S. (2006). Identification of a gonadotropin-releasing hormone receptor orthologue in *Caenorhabditis elegans*. *BMC Evolutionary Biology*, 6:103. Selected as a Research Highlight paper online.
12. Webber, K.M., Stocco, D.M., Casadesus, G., **Bowen, R.L.**, Atwood, C.S., Preville, L.A., Harris, P.L., Zhu, X., Perry, G., Smith, M.A. (2006) Steroidogenic acute regulatory protein (StAR): Evidence of gonadotropin-induced steroidogenesis in Alzheimer disease. *Molecular Neurodegeneration*, 1, 14.
13. Wilson, A.C., Salamat, S., Haasl, R.J., Roche, K.M., Karande, A., Vadakkadath Meethal, S., Terasawa, E., **Bowen, R.L.** and Atwood, C.S. (2006). Human extra-pituitary neurons possess GnRH I receptors that respond to GnRH by expressing luteinizing hormone. *Journal of Endocrinology*, 191, 651-665.
14. Liu, T., Wimalasena, J., **Bowen, R.L.** and Atwood, C.S. (2007). Luteinizing hormone receptor mediates neuronal pregnenolone production via upregulation of steroidogenic acute regulatory protein expression. *Journal of Neurochemistry*, 100(5), 1329-1339.
15. Atwood, C.S. and **Bowen, R.L.** (2008). A multi-hit endocrine model of intrinsic adult-onset asthma. *Ageing Research Reviews*, 7(2): 114-125.
16. Wilson, A.C., Clemente, L., Liu, T., **Bowen, R.L.**, Vadakkadath Meethal, S. and Atwood, C.S. (2008). Reproductive hormones

- regulate the selective permeability of the blood-brain barrier. *Biochimica Biophysica Acta - Molecular Basis of Disease*, 1782(6): 401-407 .
17. Haasl, R.J., Reza Ahmadi, M., Vadakkadath Meethal, S., Gleason, C.E., Johnson, S.C., Asthana, S., **Bowen, R.L.** and Atwood, C.S. (2008). A luteinizing hormone receptor intronic variant is significantly associated with decreased risk of Alzheimer's disease in males carrying an apolipoprotein E e4 Allele, *BMC Medical Genetics* 9(1): 37.
  18. Gallego, M., Porayette, P., Kaltcheva, M., **Bowen, R.**, Vadakkadath Meethal, S. and Atwood, C. Trophoblastic hormones direct early human embryogenesis. Available from Nature Precedings <<http://hdl.handle.net/10101/npre.2008.2671.1>> (2008) (submitted)
  19. Porayette, P., Gallego, M.J., Kaltcheva, M.M., **Bowen, R.L.**, Vadakkadath Meethal, S. and Atwood, C.S. (2009). Differential processing of amyloid-beta precursor protein directs human embryonic stem cell proliferation and differentiation into neuronal precursor cells. *Journal of Biological Chemistry*, 284(35), 23806-23817.
  20. Vadakkadath Meethal, S., Liu, T., Chan, H., Ginsburg, E., Wilson, A.C., Gray, D.N., **Bowen, R.L.**, Vonderhaar, B.K. and Atwood, C.S. (2009). Identification of a regulatory loop for the synthesis of neurosteroids: A StAR-dependent mechanism involving HPG axis receptors. *Journal of Neurochemistry*, 110, 1014-1027.
  21. Simon, D., Vadakkadath Meethal, S., Wilson, A.C., Gallego, M.J., Weinecke, S.L., Bruce, E., Lyons, P., Haasl, R.J., **Bowen, R.L.** and Atwood, C.S. (2009). Activin receptor signaling regulates prostatic epithelial cell adhesion and viability. *Neoplasia*, 11(4):365-376.
  22. Gallego MJ1, Porayette P, Kaltcheva MM, **Bowen RL**, Vadakkadath Meethal S, Atwood CS. The pregnancy hormones human chorionic gonadotropin and progesterone induce human embryonic stem cell proliferation and differentiation into neuroectodermal rosettes. *Stem Cell Res Ther.* 2010 Sep 13;1(4)
  23. **Bowen RL**, Perry G, Xiong C, Smith MA, Atwood CS. A clinical study of lupron depot in the treatment of women with Alzheimer's disease: preservation of cognitive function in patients taking an acetylcholinesterase inhibitor and treated with high dose lupron over 48 weeks. *J Alzheimers Dis.* 2015;44(2):549-60.
  24. Atwood CS, **Bowen RL**. The endocrine dyscrasia that accompanies menopause and andropause induces aberrant cell cycle signaling that triggers re-entry of post-mitotic neurons into the cell cycle,

- neurodysfunction, neurodegeneration and cognitive disease. *Horm Behav.* 2015 Nov;76:63-80. Epub 2015 Jul 16.
25. Atwood CS, **Bowen RL**. A Unified Hypothesis of Early- and Late-Onset Alzheimer's Disease Pathogenesis. *J Alzheimers Dis.* 2015;47(1):33-47.
  26. **Bowen RL**, Butler T, Atwood CS. Not All Androgen Deprivation Therapies Are Created Equal: Leuprolide and the Decreased Risk of Developing Alzheimer's Disease. *J Clin Oncol.* 2016 Aug 10;34(23):2800. Epub 2016 Jun 13.
  27. Atwood CS, Hayashi K, Meethal SV, Gonzales T, **Bowen RL**. Does the degree of endocrine dyscrasia post-reproduction dictate post-reproductive lifespan? Lessons from semelparous and iteroparous species. *Geroscience.* 2017 Feb;39(1):103-116. Epub 2017 Mar 7.

### **Clinical Trial Experience**

1. Principle investigator for "Echocardiographic assessment of Patients receiving Long-Term Treatment with Anorexiant Medications" Over 150 subjects were enrolled over a 6 month period. Subjects were seen monthly for 12 months and underwent cardiac ultrasound at baseline and every three months thereafter. The study was sponsored by Wyeth at the insistence of the FDA after data I submitted to MedWatch resulted in fenfluramine being removed from the market due to cardiac valvulopathy. 1998-1999.
2. Principle investigator for "An Association of Elevated Serum Gonadotropin Concentrations and Alzheimer Disease?" Sixty Nine patients were recruited to provide blood samples in order to compare serum gonadotropin concentrations in patient's with dementia vs. age-matched controls.
3. Principle investigator for "A clinical study of lupron depot in the treatment of women with Alzheimer's disease: preservation of cognitive function in patients taking an acetylcholinesterase inhibitor and treated with high dose lupron over 48 weeks." One hundred two subjects were recruited over a nine month period at five sites.

### **Book Chapters/Book Reviews/Commentaries/Letters to Editor:**

1. **Bowen, RL**. Sex hormones, amyloid protein, and Alzheimer disease. (2001) *JAMA*;286(7): 790-1
2. Masters, C., Stanculescu, N., **Bowen, R.**, Bishop, G., Morgan, J.P., Smith, M., Perry, G., Teplow, D., Kim, S.H., DeKosky, S., Chen, M.,

- Atwood, C. and Kinoshita, J. (2001) Transcript of Live Discussion: Nomenclature Discussion. *Alzheimer Research Forum*, [http://www.alzforum.org/res/for/journal/nomenclature/nom\\_transcript.asp](http://www.alzforum.org/res/for/journal/nomenclature/nom_transcript.asp).
3. Smith, M.A., Perry, G., Atwood, C.S. and **Bowen, R.L.** (2003) Estrogen replacement and risk of Alzheimer disease (Letter). *JAMA*, 289, 1100.
  4. Atwood CS, Barzilai N, **Bowen RL**, Brown-Borg HM, Jarrard DF, Fu VX, Heilbronn LK, Ingram DK, Ravussin E, Schwartz RS, Weindruch R. Pennington scientific symposium on mechanisms and retardation of aging. *Exp Gerontol.* 2003 Oct;38(10):1217-26.
  5. Atwood, C.S., **Bowen, R.L.**, Smith, M.A. and Perry, G. (2003) Cerebrovascular requirement for sealant, anti-coagulant and remodeling molecules that allow for the maintenance of vascular integrity and blood supply. *Brain Res. Rev.*, 43, 164-178.
  6. Webber, K.M., **Bowen, R.**, Casadesus, G., Perry, G., Atwood, C.S. and Smith, M.A. (2004) Gonadotropins and Alzheimer's disease: the link between estrogen replacement therapy and neuroprotection. *Acta Neurobiol. Exp.*, 64, 113-118.
  7. Atwood, C., **Bowen, R.**, Casadesus, G., Perry, G., Smith, M.A. and Webber, K. (2004) Comment: Sex, aging and Alzheimer's disease. *Alzheimer Research Forum*, 2004, <http://www.alzforum.org/com/poll/polldetail.asp?PollID=32>.
  8. **Bowen, R.**, Atwood, C.S., Perry, G. and Smith, M.A. (2004) Mechanisms involved in gender differences in Alzheimer's disease: the role of leuteinizing and follicle stimulating hormones. In *Principles of Gender-Specific Medicine*, Legato, M.L. (Ed.). Elsevier Academic Press, San Diego, pp 1234-1237.
  9. **Bowen RL**, Gregory CW. Sex hormones and ApoE4: beyond steroids. *J Alzheimers Dis.* 2004 Jun;6(3):229-30.
  10. Zhu, X., Webber, K.M., Casadesus, G., Raina, A.K., Lee, H.G., Marlatt, M., Hartzler, A., Atwood, C.S., **Bowen, R.**, Perry, G. and Smith, M.A. (2004) Mitotic and gender parallels in Alzheimer disease: therapeutic opportunities. *Curr. Drug Targets*, 5, 559-563.
  11. Casadesus, G., Zhu, X., Atwood, C.S., Webber, K.M., Perry, G., **Bowen, R.L.** and Smith, M.A. (2004) Beyond estrogen: targeting gonadotropin hormones in the treatment of Alzheimer's disease. *Curr. Drug Targets CNS Neurol. Disord.*, 3, 281-285.

12. Casadesus, G., Atwood, C.S., Zhu, X., Hartzler, A.W., Webber, K.M., Perry, G., **Bowen, R.L.** and Smith, M.A. (2005) Evidence for the role of gonadotropin hormones in the development of Alzheimer disease. *Cell. Mol. Life Sci.*, 62, 293-298
13. Atwood, C.S., Meethal, S.V., Liu, T., Wilson, A.C., Gallego, M., Smith, M.A. and **Bowen, R.L.** (2005) Dysregulation of the hypothalamic-pituitary-gonadal axis with menopause and andropause promotes neurodegenerative senescence. *J. Neuropathol. Exp. Neurol.*, 64, 93-103.
14. Atwood, C.S., Smith, M.A. and **Bowen, R.L.** (2005) Feedback on a feedback loop: the hypothalamic-pituitary-gonadal axis. *J. Alzheimers Dis.*, 7, 1-2.
15. **Bowen, R.L.**, Martins, R.N., Gregory, C.W., Smith, M.A. and Atwood, C.S. (2005) Dementia and testosterone levels in men. *JAMA*, 293, 551.
16. Meethal, S.V., Smith, M.A., **Bowen, R.L.** and Atwood, C.S. (2005) The gonadotropin connection in Alzheimer's disease. *Endocrine*, 26, 317-326.
17. Webber, K.M., Casadesus, G., Perry, G., Atwood, C.S., **Bowen, R.**, and Smith, M.A. (2005) Gender differences in Alzheimer disease: the role of luteinizing hormone in pathogenesis. *Alz Dis Assoc Disord*, 19, 95-99.
18. Webber, K.M., Casadesus, G., Marlatt, M.W., Perry, G., Hamlin, C.R., Atwood, C.S., **Bowen, R.L.** and Smith, M.A. (2005) Estrogen bows to a new master: the role of gonadotropins in Alzheimer pathogenesis. *Ann. N.Y. Acad. Sci.*, 1052, 201-209.
19. Ashford, J.W., Atwood, C.S., Blass, J.P., **Bowen, R.L.**, Finch, C.E., Iqbal, K., Joseph, J.A., Perry, G. (2005). What is aging? What is its role in Alzheimer's disease? What can we do about it? *J. Alzheimers Dis.* 7(3), 247-253.
20. Gregory CW, **Bowen RL.** Novel therapeutic strategies for Alzheimer's disease based on the forgotten reproductive hormones. (2005) *Cell Mol Life Sci.* Feb;62(3):313-9.Review.
21. Atkinson RL, Dhurandhar NV, Allison DB, **Bowen RL**, Israel BA, Albu JB, Augustus AS. Human adenovirus-36 is associated with increased body weight and paradoxical reduction of serum lipids. (2005) *Int J Obes (Lond)*. Mar;29(3):281-6.
22. Webber, K.M., Casadesus, G., Zhu, X., Obrenovich, M.E., Atwood, C.S., Perry, G., **Bowen, R.L.** and Smith, M.A. (2006) The cell cycle and hormonal fluxes in Alzheimer disease: a novel therapeutic target. *Curr. Pharm. Design*, 12, 691-697.

23. Zhu, X., Casadesus, G., Webber, K.M., Atwood, C.S., **Bowen, R.L.**, Perry, G. and Smith, M.A. (2006) Parallels between neurodevelopment and neurodegeneration: a case study of Alzheimer disease. In *Handbook of Neurochemistry and Molecular Neurobiology*, 3e, Vol 17, *Developmental and Aging Changes in the Nervous System*, Perez-Polo, R. and Rossner, S. (Eds.). Kluwer Academic/Plenum Publishers, New York, New York, in press.
24. Casadesus, G., Garrett, M.R., Webber, K.M., Hartzler, A.W., Atwood, C.S., Perry, G., **Bowen, R.L.** and Smith, M.A. (2006) The estrogen myth: potential use of gonadotropin-releasing hormone agonists for the treatment of Alzheimer's disease. *Drugs R D*, 7, 187-193.
25. Casadesus, G., Webber, K.M., Atwood, C.S., **Bowen, R.L.**, Perry, G. and Smith, M.A. (2006) Luteinizing hormone mediates Alzheimer-type changes in neurons. In *Alzheimer's Disease: New Advances*, Iqbal, K., Winblad, B. and Avila, J. (Eds.). Medimond S.r.l., Bologna, Italy, pp 307-310.
26. Webber, K.M., Stocco, D.M., Casadesus, G., **Bowen, R.L.**, Atwood, C.S., Preville, L.A., Harris, P.L.R., Zhu, X., Perry, G. and Smith, M.A. (2006) Steroidogenic acute regulatory protein (StAR): evidence of gonadotropin-induced steroidogenesis in Alzheimer disease. In *Alzheimer's Disease: New Advances*, Iqbal, K., Winblad, B. and Avila, J. (Eds.). Medimond S.r.l., Bologna, Italy, pp 581-584.
27. Gregory, C.W., Atwood, C.S., Smith, M.A. and **Bowen, R.L.** (2006) Antigonadotropins: a novel strategy to halt Alzheimer's disease neurodegeneration. *Curr. Pharm. Design*, 12, 685-690.
28. Webber, K.M., Casadesus, G., Atwood, C.S., **Bowen, R.L.**, Perry, G. and Smith, M.A. (2007). Gonadotropins: a cohesive gender-based etiology of Alzheimer disease. *Molecular and Cellular Endocrinology*, 260-262:271-275. Epub 2006 Oct 18.
29. Casadesus, G., Ramiro Puig, E., Webber, K.M., Atwood, C.S., Castell Escuer, M., **Bowen, R.L.**, Perry, G. and Smith, M.A. (2006) Targeting gonadotropins: an alternative option for Alzheimer disease treatment. *J. Biomed. Biotechnol.*, in press
30. Webber, K.M., Casadesus, G., **Bowen, R.L.**, Perry, G. and Smith, M.A. (2007) Evidence for the role of luteinizing hormone in Alzheimer disease. *Endocr. Metab. Immune Disord. Drug Targets*, 7, 300-303.
31. Wilson, A.C., Meethal, S.V., **Bowen, R.L.** and Atwood, C.S. (2007). Leuprolide acetate: a drug of diverse clinical applications. *Expert Opin Investig Drugs*, 16(11):1851-1863.



32. Casadesus, G., Rolston, R.K., Webber, K.M., Atwood, C.S., **Bowen, R.L.**, Perry, G. and Smith, M.A. (2008) Menopause, estrogen and gonadotropins in Alzheimer disease. In *Advances in Clinical Chemistry*, Vol. 45, Makowski, G.S. (Ed.). Elsevier Inc., San Diego, pp 139-153.
33. Zhu, X., Casadesus, G., Webber, K.M., Atwood, C.S., **Bowen, R.L.**, Perry, G. and Smith, M.A. (2008) Parallels between neurodevelopment and neurodegeneration: a case study of Alzheimer disease. In *Handbook of Neurochemistry and Molecular Neurobiology*, 3e, Vol 17, Developmental and Aging Changes in the Nervous System, Perez-Polo, R. and Rossner, S. (Eds.). Kluwer Academic/Plenum Publishers, New York, in press.

#### **Abstracts:**

1. **Bowen, RL.** (1998) "Echocardiographic evaluation of patients treated with anorexiant medications." *International Journal of Obesity*, Vol. 22 (Suppl 3): S77,
2. Atkinson RL, Dhurandhar NV, Allison D, **Bowen RL**, Israel B. (1998) "Evidence for an association of an obesity virus with human obesity at three sites in the United States." *International Journal of Obesity*, Vol. 22(Suppl 3): S77
3. **Bowen, RL**, Isley J., Atkinson R.L. (1999) "Association of Elevated Gonadotropins and Alzheimer's Disease" *FASEB Journal* Vol. 13 (4) Part I: A145
4. **Bowen R.L.** Gonadotropins and Alzheimer's disease (2001) Challenging Views of Alzheimer's Disease Symposium, Cincinnati, OH
5. **Bowen RL** Dying for sex. (2001) Second Neurobiology of Aging Conference. San Diego, Ca November
6. Short RA, **Bowen RL**, O'Brien PC, Graff-Radford NR, (2001) Elevated Gonadotropins in Alzheimer's Disease, AAN
7. **Bowen, R.L.**, Atwood, C., Perry, G. and Smith, M. (2001) Alzheimer's disease - - - dying for sex? *Brain Aging: Identifying Accelerators and Brakes*, 119.
8. **Bowen, R.L.**, Atwood, C., Perry, G. and Smith, M.A. (2002) Alzheimer's disease – dying for sex? *Neurodegenerative Disorders: Common Molecular Mechanisms*, 60
9. Atwood, C.S., Perry, G., Kubat, Z., Harris, P.L., **Bowen, R.L.** and Smith, M.A. (2002) Neurotropic actions of gonadotropins: Implications for

- the pathogenesis of Alzheimer's disease. *The 3<sup>rd</sup> Neurobiology of Aging Conference*, P16 (pp 69-70).
10. **Bowen, RL**, Smith MA, Kubat Z, Harris P, Perry G, Atwood CS. (2002) Increased gonadotropin production secondary to age related loss of reproductive function as a risk factor for Alzheimer's disease. Eighth International Conference on Alzheimer's Disease and Related Disorders. Stockholm, Sweden
  11. **Bowen RL**, Dying for sex. (2002) Third Neurobiology of Aging Conference. Orlando, FL November
  12. Atwood, C., Perry, G., Kubat, Z., Harris, P., **Bowen, R.** and Smith, M.A. (2002) Luteinizing hormone is a potent neuronal mitogen: implications for the pathogenesis of Alzheimer's disease. *Neurodegenerative Disorders: Common Molecular Mechanisms*, 61.
  13. Atwood, C., Perry, G., Kubat, Z., Harris, P., Smith, M. and **Bowen, R.** (2002) Luteinizing hormone is a potent neuronal mitogen: implications for the pathogenesis of Alzheimer's disease. *Neurobiol. Aging*, 23 (Suppl. 1), S528.
  14. **Bowen, R.L.**, Smith, M.A., Kubat, Z., Harris, P., Perry, G. and Atwood, C. (2002) Increased gonadotropin production secondary to age-related loss of reproductive function as a risk factor for Alzheimer's disease. *Neurobiol. Aging*, 23 (Suppl. 1), S531.
  15. Atwood, C.S., Perry, G., Kubat, Z., Harris, P.L., **Bowen R.L.**, and Smith, M.A. (2002) Neurotropic actions of gonadotropins: implications for the pathogenesis of Alzheimer's disease. *3<sup>rd</sup> Neurobiology of Aging Conference*, 69-70.
  16. **Bowen RL**, Atwood CS, (2002) Dying for sex. Seventh Neurodegenerative Disorders: Common Molecular Mechanisms Conference. Jamaica April
  17. **Bowen RL**, Smith MA, Atwood CS (2003) Living and Dying for Sex. Understanding the Biology of Sex Differences Conference. Winston-Salem, NC
  18. Atwood, C.S., Verdile, G., Liu, T., Smith, M.A., Martins, R.N. and **Bowen, R.L.** (2003) Menopause/andropause induced elevations in serum gonadotropins drive AβPP processing towards the amyloidogenic pathway. *Soc. Neurosci. Abstr.*, Program No. 523.22.
  19. Casadesus, G., Ogawa, O., **Bowen, R.L.**, Atwood, C.S., Perry, G. and Smith, M.A. (2003) Modulation of hippocampal plasticity and cognition in the SWAPP transgenic mouse by the gonadotropin-releasing hormone agonist luproliide [sic] acetate: involvement of lutenizing [sic] hormone in the pathogenesis and treatment of AD. *Soc. Neurosci. Abstr.*, Program No. 945.8.

20. Casadesus, G., Webber, K.M., Ogawa, O., **Bowen, R.L.**, Perry, G. and Smith, M.A. (2004) Involvement of luteinizing hormone in the pathogenesis and treatment of Alzheimer disease. *Research ShowCASE 2004*, 275.
21. Webber, K.M., Casadesus, G., Ogawa, O., **Bowen, R.L.**, Atwood, C.S., Pappolla, M.A., Perry, G. and Smith, M.A. (2004) Improvement of hippocampal function and decreased amyloid burden in the aged SwAPP transgenic mouse after treatment with the gonadotropin-releasing hormone agonist leuprolide acetate. Is luteinizing hormone involved in the pathogenesis of AD? *27th Annual Biomedical Graduate Student Symposium*, 50-51.
22. Casadesus, G., Webber, K.M., **Bowen, R.L.**, Atwood, C.S., Pappolla, M.A., Castellani, R.J., Raina, A.K., Perry, G. and Smith, M.A. (2004) Differential regulation of hippocampal function and plasticity by luteinizing hormone during normal aging and Alzheimer disease. *J. Neuropathol. Exp. Neurol.*, 63, 521.
23. Webber, K.M., Casadesus, G., Ogawa, O., **Bowen, R.L.**, Atwood, C.S., Pappolla, M.A., Perry, G. and Smith, M.A. (2004) Improved hippocampal function in aged SwAPP mice after pharmacological reduction of luteinizing hormone release with leuprolide acetate. *J. Neuropathol. Exp. Neurol.*, 63, 521.
24. Atwood, C.S., Liu, T., Smith, M.A., Martins, R.N., **Bowen, R.L.** and Verdile, G. (2004) 17 $\beta$ -estradiol and luteinizing hormone modulate the expression of luteinizing hormone receptors in neuroblastoma cells. *Neurobiol. Aging*, 25 (Suppl. 2), S40.
25. Zhu, X., McShea, A., Harris, P.L., Raina, A.K., Castellani, R.J., Funk, J.O., Shah, S., Atwood, C.S., **Bowen, R.**, Bowser, R., Morelli, L., Perry, G. and Smith, M.A. (2004) Elevated expression of a regulator of the G2/m phase of the cell cycle, neuronal CIP-1 associated regulator of cyclin B, in Alzheimer disease. *Neurobiol. Aging*, 25 (Suppl. 2), S40.
26. Casadesus, G., Webber, K.M., Ogawa, O., **Bowen, R.L.**, Atwood, C.S., Perry, G. and Smith, M.A. (2004) Modulation of cognition and amyloid load in the aged SwA $\beta$ PP transgenic mouse by luprolide [sic] acetate, a GNRH agonist: targeting luteinizing hormone as a novel treatment for AD. *Neurobiol. Aging*, 25 (Suppl. 2), S203.
27. Liu, T., Smith, M.A., **Bowen, R.L.** and Atwood, C.S. (2004) Gender and disease-related differences in the expression of cortical luteinizing hormone receptor. *Soc. Neurosci. Abstr.*, Program No. 448.6.

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### Online -Articles and Commentaries

1. Live Discussion: Gonadal Hormone Withdrawal, Apoptosis, and Generation of Beta Amyloid Peptide: A Vicious Cycle of Amyloidogenesis and Neurotoxicity in Alzheimer's Disease. Alzheimer Research Forum; December 5, 2001
2. Live Discussion: Alzheimer Genes in Cortical Development: How Do Their Prenatal Functions Relate to Dementia? Alzheimer Research Forum; July 12, 2002  
Live Discussion: Alzheimer's Disease Nomenclature. Alzheimer Research Forum; August 14, 2001
3. Live Discussion. Alzheimer Immunotherapy Trial Grounded: Time to Reassess Safety and Vaccine Design. Alzheimer Research Forum; March 5, 2002
4. Commentary for Alzheimer Research Forum on "Urocortin Is Potent Protector of Hippocampal Neurons" Pedersen WA, Wan R, Zhang P, Mattson MP. Urocortin, but not urocortin II, protects cultured hippocampal neurons from oxidative and excitotoxic cell death via corticotropin-releasing hormone receptor type I. *J Neurosci* 2002 Jan 15;22(2):404-12
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## **Invited Talks**

1. Neurodegenerative Diseases: Common Molecular Mechanisms Conference, Alzheimer's Disease...Dying for Sex? Montego Bay, Jamaica, 2002.
2. Voyager Pharmaceutical Corporation, Gonadotropins Promote Biochemical Changes Associated with Alzheimer's Disease, Pre-clinical Scientific Meeting, Charleston, SC, 2002
3. Pennington Scientific Symposium-Mechanisms and Retardation of Aging, 'Endocrine Changes Following Menopause/Andropause Drive Neurodegeneration During Senescence', Baton Rouge, LA, 2003.
4. Challenging Views of Alzheimer's Disease, Roundtable participant: 'What is Aging, What Is its Role in Alzheimer's Disease and What Can We Do About It?', Philadelphia, PA, 2004.
5. Alzheimer's Disease: From Molecular Mechanism to Drug Discovery Conference Cancun, Mexico, 2004
6. Hollister-Steir Corp. Annual Company Awards Meeting: Insights to 'Drug Discovery" November 2004
7. US EPA Endocrine Disrupting Chemical Forum February 9, 2005 USEPA, NHEERL, Reproductive Toxicology Division EB, MD-72 Research Triangle Park, NC 27711 "Neurodegeneration and the Forgotten Hormones of the HPG Axis"

## **Patents and Patent Applications**

1. Methods for preventing and treating Alzheimer's disease. United States Patent 6,242,421 Issued: June 5, 2001
2. Methods for slowing senescence and treating and preventing diseases associated with senescence Serial No. 321579 Filed: December 18, 2002 (This patent will likely be divided into numerous individual patents)
3. Methods for treating and preventing excessive appetite Filed: 11-08