

# Stealth adapted viruses – possible drivers of major neuropsychiatric illnesses including alzheimer’s disease

## Abstract

Mainstream neurologists and psychiatrists have largely refrained from serious consideration of a virus cause of common brain diseases. This is mainly because of the general lack of any accompanying immune system stimulated inflammatory reaction within the brain. This article exposes a weakness in this argument by describing the process of “stealth adaptation” of viruses. Deletion or mutation of relatively few virus components can result in derivative viruses, which are no longer effectively recognized by the cellular immune system. Consequently, there is no triggering of the inflammatory response. Furthermore, the brain is uniquely susceptible to symptomatic illness caused by stealth adapted viruses. An understanding of stealth adaptation greatly expands the potential scope of viral illnesses. It also underscores the value of using virus cultures as a diagnostic tool and of taking appropriate measures to avoid transmission of infection. More importantly, therapeutic measures are available for suppressing both stealth adapted and conventional virus infections through enhancement of the alternative cellular energy (ACE) pathway. Such measures are available for clinical evaluation in treating many of the major illnesses affecting the brain, including Alzheimer’s disease.

**Keywords:** Alzheimer’s disease, Neurology, Psychiatry, Cellular immunity, Immune evasion, Inflammation, Alternative cellular energy, ACE, Stealth adapted viruses, Herpes simplex virus, HSV, Enerceuticals™, KELEA, CFS, Chronic fatigue syndrome, Dementia, Encephalopathy

Volume 2 Issue 3 - 2015

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**Received:** May 22, 2015 | **Published:** June 22, 2015

**Abbreviations:** KELEA, Kinetic Energy Limiting Electrostatic Attraction; ACE, Alternative Cellular Energy; CFS, Chronic Fatigue Syndrome; CPE, Cytopathic Effect; HSV, Herpes Simplex Virus; SCMV, African Green Monkey Simian Cytomegalovirus; HCMV, Human Cytomegalovirus; CTL, Cytotoxic T Lymphocytes; CSF, Cerebrospinal Fluid; CPE, Cytopathic Effect; ALS, Amyotrophic Lateral Sclerosis; ACE, Alternative Cellular Energy; UV, Ultraviolet; ICE, Insufficiency of Cellular Energy

## Introduction

With the possible exception of cancer, diseases of the brain comprise most of the worst feared human ailments. Whether it is the increasing likelihood of autism occurring in children,<sup>1</sup> or Alzheimer’s disease occurring in the elderly,<sup>2</sup> the current medical paradigms are failing to provide effective answers. Nor has significant progress been made in addressing many other tragic illnesses, such as schizophrenia, bipolar psychosis, Parkinson’s disease and amyotrophic lateral sclerosis (ALS). Society is further challenged by a range of somewhat less severe but still disabling illnesses, including chronic fatigue syndrome (CFS), fibromyalgia, depression, drug addiction, criminal behaviors and intellectual impairments affecting both learning and work performances.

Various investigators have suggested a possible infectious origin of several of the aforementioned neuropsychiatric illnesses.<sup>3-11</sup> Because of the absence of noticeable inflammation, however, it is usually argued that if infectious agents are indeed involved, their effects must be indirect and quite possibly delayed. For example, common infections occurring during pregnancy can clearly lead to elevated levels of various cytokines as part of the immune response. There are supporting data that maternal cytokines may significantly inhibit normal fetal brain development, with potential

later life consequences.<sup>12-14</sup> Other researchers have suggested that certain infectious agents might potentially trigger the production of antibodies, which cross-react with neuronal components, thereby interfering with normal brain function. Such self-reacting antibodies may continue to form as part of an ongoing autoimmune process.<sup>15-17</sup> None of these scenarios envisions viruses as the direct cause of ongoing cellular injury.

## Evidence for a role of Herpes Simplex Virus (HSV) in alzheimer’s disease

There are, nevertheless, data suggesting an active role of HSV in the ongoing pathogenesis of Alzheimer’s disease.<sup>10,18-30</sup> These indications include the following findings:

- i. HSV infected fibroblasts secrete both beta-amyloid and tau-proteins, which are the accepted diagnostic markers of Alzheimer’s disease.<sup>21-22</sup> Rather than being a primary cause of Alzheimer’s disease, these markers may, therefore, be secondary phenomena occurring as a consequence of virus damage to neuronal cells.
- ii. Budding herpes viruses directly interact with amyloid precursor protein, affecting the normal transport and distribution of this protein.<sup>23-24</sup>
- iii. HSV DNA is detected in association with the amyloid plaques and also with the neurofibrillary tangles that are mostly comprised of phosphorylated tau proteins.<sup>25</sup>
- iv. Alzheimer’s disease plaques and tangles also contain complement factors and HSV binding cellular proteins.<sup>26</sup>
- v. The distribution of the Alzheimer’s disease markers progressively involves increasing areas of the brain; consistent with the spreading of an infectious process.<sup>27</sup>

- vi. Many of the gene alleles shown to significantly enhance susceptibility to Alzheimer's disease, e.g. ApoE-e4, are also known to promote the infectivity of cells by HSV.<sup>28-29</sup>
- vii. Anti-HSV antibody levels, including IgM, increase in conjunction with the onset of Alzheimer's disease;<sup>30</sup> yet the avidity (binding capacity) of anti- HSV antibody is lower in those with more severe disease,<sup>31</sup> consistent with reduced antibody protection.
- viii. Suggestive clinical improvements have occurred in Alzheimer's disease patients receiving therapies that could potentially inhibit HSV. Examples include intravenous gamma globulin<sup>32-33</sup> and statins.<sup>34</sup>

HSV is an extremely common human infection and can be detected in brains of individuals with or without Alzheimer's disease.<sup>35</sup> Similarly, some unaffected individuals can possess the same genetic markers as are present in a higher proportion of patients with Alzheimer's disease. Possibly, Alzheimer's disease results from infection with only certain variant HSV occurring in genetically prone individuals. It is noteworthy that studies to potentially distinguish HSV isolates from Alzheimer's disease patients and controls have not been pursued.

### Lack of disease specificity of identified genetic markers of alzheimer's disease

Similar genetic markers operating in Alzheimer's disease are increasingly being found in association with other neuropsychiatric illnesses such as autism, bipolar psychosis and schizophrenia.<sup>36</sup> Moreover, several of the identified genes not only enhance the infectivity of HSV but also of other viruses.<sup>37</sup> Furthermore, many herpes viruses can induce similar types of acquired genetic changes as commonly seen in the genome of patients with various neuropsychiatric illnesses. These include shortened leukocyte telomeres<sup>38</sup> and altered copy numbers of certain gene sequences.<sup>39</sup> These findings help deemphasize the focus on the existence of a specific Alzheimer's disease virus. Instead, they suggest the possibility of multiple types of pathogenic viruses, each of which can potentially cause differing diseases depending upon host genetic factors and on other variables. Still, the major stumbling block for many of those proposing an ongoing infectious cause of neuropsychiatric illnesses is the lack of an accompanying inflammatory response and the general inability to reliably culture viruses from the patients.<sup>3-4</sup> In reality, these are not valid arguments since they do not exclude infections with stealth adapted viruses.

### Detection of stealth adapted viruses

By adjusting the virus culturing technique, atypical viruses were detected in the vast majority of patients with symptomatic neurological and psychiatric illnesses.<sup>40-50</sup> Some of the cultured viruses were molecularly characterized as derivatives of African green monkey simian cytomegalovirus (SCMV). Other cultured viruses showed differing patterns of molecular reactivity, consistent with the concept that stealth adaptation is a generic process, which may occur with all human and animal viruses. In the case of human cytomegalovirus (HCMV), an estimated 90% of the evoked cytotoxic T lymphocytes (CTL) are directed against only 3 of the over 200 virus coded components.<sup>51</sup> Deletion and/or mutation of these 3 coding genes can result in a virus still capable of inducing illness, but without evoking any inflammation. Moreover, downsizing of the virus genome can help explain the apparent widening of the species susceptibility of certain stealth adapted viruses, including the possibility of transmission to bacteria and acquisition of bacterial sequences.<sup>50,52</sup>

### Lack of precision in clinical diagnoses of neurodegenerative illnesses

A major overlap in clinical diagnoses exists in elderly patients between severe CFS and early Alzheimer's disease. Loss of short-term memory and other cognitive deficits are common to both illnesses.<sup>53-54</sup> So too are fatigue, sleep disturbance and signs of autonomic nervous system dysfunction.<sup>54-57</sup> This clinical overlap is somewhat obscured because Alzheimer's patients are primarily diagnosed by neurologists and comprise a more elderly population than CFS patients, who are more typically diagnosed by primary care physicians. Consulting pathologists have an advantage in identifying overlapping clinical features by being involved with clinicians of multiple specialties and also by occasionally testing samples from various family members with differing clinical diagnoses. This point is illustrated by the following two examples.

A 55 year-old physician maintained that he had CFS even though it became impossible for him to drive. Once he waited at a traffic light till another car came by because he had forgotten whether to proceed on the green or on the red signal. He was unable to take his patients' pulse rates since he could not recall both the counts and the elapsed time. An examining neurologist even contemplated a diagnosis of schizophrenia, when the patient spoke about "multiple little men in my brain not listening to each other." The neurologist categorized the patient as having Alzheimer's disease. Blood cultures and a culture of cerebrospinal fluid (CSF) yielded strong cytopathic effect (CPE) indicative of stealth adapted viruses.

In a family setting, a 65-year-old man showed progressive deterioration in his demeanor and personality. He began to express anger, complain of impaired memory and slept excessively during the day. He would sit idly with a blank stare. The illness forced his retirement as a bank manager. He was prescribed donepezil hydrochloride (Aricept) for Alzheimer's disease. Over the next several months his wife lost her capacity to provide adequate care as she too was becoming emotionally distant, fatigued and paranoid. The couples' daughter made arrangements to share her house with her parents. She soon developed CFS while her husband also began to lose some cognitive skills. He went on to develop amyotrophic lateral sclerosis (ALS). The health of their 4 children also began to deteriorate. The eldest son noted a marked loss of short-term memory and diminishing muscle strength with frequent tingling. A 14-year-old daughter had a distinct mono-like illness with sore throat and fatigue that did not fully resolved. Her school and sporting performance changed from being a gifted student active on the softball team to barely being able to cope with her studies and relegated to a back-up cheerleading squad. Her mother withdrew her from school to try to provide home schooling to make up for the shortcomings in her learning capacity. She was prescribed Prozac for depression and also began to experience frequent migraines and to become somewhat obese. Two younger daughters also began to experience short-term memory loss and were soon unable to attend regular school because of an attention deficit disorder.

This striking family history is clearly consistent with an infectious process. In much the same way that CFS is not regarded as a contagious disease, it is possible that a strong bias exists against attributing any risk to caregivers of patients with Alzheimer's disease. Yet caregiver burnout is a recognized condition, which has not been thoroughly investigated.<sup>58-59</sup> Many genetic and environmental factors can modify the course of an infection, but can also be mistaken as a primary cause of illness if the infectious agent is overlooked.

## Alternative cellular energy (ACE) pathway

A cellular defense mechanism mediated by the ACE pathway can suppress the CPE caused by stealth adapted viruses. As reported elsewhere, the CPE in cultures of stealth adapted viruses will typically regress in infrequently re-fed cultures.<sup>60,61</sup> Along with studies on human brain biopsies,<sup>62</sup> mineral containing particulate materials accumulating in the infrequently re-fed cultures are effective in suppressing virus CPE. These materials, termed ACE pigments, have energy transducing (converting) properties and apparently maintain cellular viability in spite of marked disruption in the cells' mitochondria. ACE pigments are electrostatic; fluorescent in both ultraviolet [UV] and visible light, especially upon the addition of certain dyes, including neutral red and acridine orange; display kinetic movements well beyond Brownian motions; are occasionally ferromagnetic; and can act as electron donors.<sup>61</sup> Further insight into the ACE pathway was provided by studies on the effectiveness of neutral red dye plus UV light in the expedited healing of skin lesions caused by HSV.<sup>63,64</sup>

Methods are being developed to effectively monitor the ACE pathway in individual patients.<sup>64</sup> Methods include the detection of fluorescing ACE pigments in dried perspiration and in saliva, with and without the use of a triggering agent, such as neutral red dye. The intrinsic energy level of urine and other bodily fluids can also be assessed. Even the prolongation of the duration of breath holding may become a useful ongoing measure of beneficial enhancement of the ACE pathway (unpublished).

The mode of action of ACE pigments in virus cultures has tentatively been identified as altering the kinetic activity of water molecules in the tissue culture medium. In turn, the activated water enhances the ability of the cells to reverse the virus induced CPE. The repair process is sustained by an ongoing water activation process and yet can be rapidly reversed by the replacement of ACE pigment-containing medium with fresh medium.<sup>60,61</sup>

## Enerceuticals™

Natural products have been identified with ACE pigment-like, water-modifying activity and are termed enerceuticals. Examples include humic/fulvic acids, zeolites and fresh extracts of moringa oleifera leaves.<sup>65-67</sup> Plans are underway to assess the potential therapeutic benefits of these products in patients with Alzheimer's disease. Moreover, trials can also proceed assessing the potential benefit of consuming activated water and/or using other direct means of enhancing the ACE pathway.

## Additional potential benefits of enhancing the ACE pathway

The ACE pathway can provide potential benefits to cells beyond enhancing the cells capacity to suppress virus induced CPE.<sup>68</sup> Regular cellular metabolism requires adequate supplies of oxygen and nutrients along with efficient removal of carbon dioxide and metabolic waste products. Structural damage to the brain and its blood supply, as can occur in Alzheimer's disease patients, can lead to an insufficiency of cellular energy (ICE) in brain cells. A more effective ACE pathway may help restore impaired cellular function resulting from structural damage to the brain.

## Conclusion

A role for infectious agents in the pathogenesis of Alzheimer's disease deserves consideration. Stealth adapted viruses are overlooked by the cellular immune system. These viruses have also been largely

overlooked in major studies on Alzheimer's disease. Instead the focus in Alzheimer's disease research has been the somewhat questionable assumption that beta amyloid and/or phosphorylated tau proteins are the primarily cause of brain damage. The opportunity exists to proceed directly with clinical trials in Alzheimer's patients based on monitored enhancement of the ACE pathway. Beneficial effects will add credence to the stealth adapted virus hypothesis. Moreover, stabilization of illness or actual clinical improvements will support prevention strategies based on enhancing the ACE pathway throughout life. Prevention should also entail efforts aimed at minimizing the risks of becoming infected with stealth adapted viruses.

## Acknowledgments

None.

## Conflicts of interest

None.

## References

1. Autism and Developmental Disabilities Monitoring Network Surveillance Year 2008 Principal Investigators, Centers for Disease Control and Prevention. Prevalence of autism spectrum disorders—Autism and Developmental Disabilities Monitoring Network, 14 sites, United States, 2008. *MMWR Surveill Summ.* 2012;61(3):1–19.
2. Alzheimer's Association. 2013 Alzheimer's disease facts and figures. *Alzheimers Dement.* 2013;9(2):208–245.
3. Taylor GR, Crow TJ, Ferrier IN, et al. Virus-like agent in CSF in schizophrenia and some neurological disorders. *Lancet.* 1982;2(8308):1166–1167.
4. Ahokas A, Rimón R, Koskiniemi M, et al. Viral antibodies and interferon in acute psychiatric disorders. *J Clin Psychiatry.* 1987;48(5):194–196.
5. Torrey EF. Stalking the schizovirus. *Schizophr Bull.* 1988;14(2):223–229.
6. Pert CB, Knight JG, Laing P, et al. Scenarios for a viral etiology of schizophrenia. *Schizophr Bull.* 1988;14(2):243–247.
7. Yolken R. Viruses and schizophrenia: a focus on herpes simplex virus. *Herpes.* 2004;11(Suppl 2):83A–88A.
8. Miklossy J. Alzheimer's disease – a neurospirochetosis. Analysis of the evidence following Koch's and Hill's criteria. *J Neuroinflammation.* 2011;8:90.
9. De Chiara G, Marocci ME, Sgarbanti R, et al. Infectious agents and neurodegeneration. *Mol Neurobiol.* 2012;46(3):614–638.
10. Itzhaki RF. Herpes simplex virus type 1 and Alzheimer's disease: increasing evidence for a major role of the virus. *Front Aging Neurosci.* 2014;6:202.
11. Monastero R, Caruso C, Vasto S. Alzheimer's disease and infections, where we stand and where we go. *Immun Ageing.* 2014;11(1):26.
12. Ratnayake U, Quinn T, Walker DW, et al. Cytokines and the neurodevelopmental basis of mental illness. *Front Neurosci.* 2013;7:180.
13. Buka SL, Cannon TD, Torrey EF, et al. Collaborative study group on the perinatal origins of severe psychiatric disorders. Maternal exposure to herpes simplex virus and risk of psychosis among adult offspring. *Biol Psychiatry.* 2008;63(8):809–815.
14. Brown AS, Patterson PH. Maternal infection and schizophrenia: implications for prevention. *Schizophr Bull.* 2011;37(2):284–290.
15. Hornig M. The role of microbes and autoimmunity in the pathogenesis of neuropsychiatric illness. *Curr Opin Rheumatol.* 2013;25(4):488–495.

16. Bach JF. Infections and autoimmune diseases. *J Autoimmun.* 2005;25(Suppl):74–80.
17. Carter CJ. Schizophrenia: a pathogenetic autoimmune disease caused by viruses and pathogens and dependent on genes. *J Pathog.* 2011;128318.
18. Ball MJ. “Limbic predilection in Alzheimer’s dementia: is reactivated herpes virus involved?” *Can J Neurol Sci.* 1982;9(3):303–306.
19. Itzhaki RF, Lin WR, Shang D, et al. Herpes simplex virus type 1 in brain and risk of Alzheimer’s disease. *Lancet.* 1997;349(9047):241–244.
20. Itzhaki RF, Cosby SL, Wozniak MA. Herpes simplex virus type 1 and Alzheimer’s disease: the autophagy connection. *J Neurovirol.* 2008;14(1):1–4.
21. Wozniak MA, Itzhaki RF, Shipley SJ, et al. Herpes simplex virus infection causes cellular beta-amyloid accumulation and secretase upregulation. *Neurosci Lett.* 2007;429(2–3):95–100.
22. Wozniak MA, Frost AL, Itzhaki RF. Alzheimer’s disease-specific tau phosphorylation is induced by herpes simplex virus type 1. *J Alzheimers Dis.* 2009;16(2):341–350.
23. Shipley SJ, Parkin ET, Itzhaki RF, et al. Herpes simplex virus interferes with amyloid precursor protein processing. *BMC Microbiol.* 2005;5:48.
24. Cheng SB, Ferland P, Webster P, et al. Herpes simplex virus dances with amyloid precursor protein while exiting the cell. *PLoS One.* 2001;6(3):e17966.
25. Wozniak MA, Mee AP, Itzhaki RF. Herpes simplex virus type 1 DNA is located within Alzheimer’s disease amyloid plaques. *J Pathol.* 2009;217(1):131–138.
26. Carter CJ. Alzheimer’s disease plaques and tangles: Cemeteries of a pyrrhic victory of the immune defence network against herpes simplex infection at the expense of complement and inflammation-mediated neuronal destruction. *Neurochem Int.* 2011;58(3):301–320.
27. Ball MJ, Lukiw WJ, Kammerman EM, et al. Intracerebral propagation of Alzheimer’s disease: strengthening evidence of a herpes simplex virus etiology. *Alzheimer’s Dement.* 2013;9(2):169–175.
28. Lin WR, Shang D, Itzhaki RF. Neurotropic viruses and Alzheimer disease. Interaction of herpes simplex type 1 virus and apolipoprotein E in the etiology of the disease. *Mol Chem Neuropathol.* 1996;28(1–3):135–141.
29. Carter CJ. Alzheimer’s disease: a pathogenetic autoimmune disorder caused by herpes simplex in a gene-dependent manner. *Int J Alzheimers Dis.* 2010;2010:140539.
30. Letenneur L, Peres K, Fleury H, et al. Seropositivity to herpes simplex virus antibodies and risk of Alzheimer’s disease: a population-based cohort study. *PLoS One.* 2008;3(11):e3637.
31. Kobayashi N, Nagata T, Shinagawa S, et al. Increase in the IgG avidity index due to herpes simplex virus type 1 reactivation and its relationship with cognitive function in amnesic mild cognitive impairment and Alzheimer’s disease. *Biochem Biophys Res Commun.* 2013;430(3):907–911.
32. Devi G, Schultz S, Khosrowshahi L, et al. A retrospective chart review of the tolerability and efficacy of intravenous immunoglobulin in the treatment of Alzheimer’s disease. *J Am Geriatr Soc.* 2008;56(4):772–774.
33. Wozniak MA, Itzhaki RF. Intravenous immunoglobulin reduces  $\beta$  amyloid and abnormal tau formation caused by herpes simplex virus type 1. *J Neuroimmunol.* 2013;257(1–2):7–12.
34. Hill JM, Steiner I, Matthews KE, et al. Statins lower the risk of developing Alzheimer’s disease by limiting lipid raft endocytosis and decreasing the neuronal spread of Herpes simplex virus type 1. *Med Hypotheses.* 2005;64(1):53–58.
35. Wozniak MA, Shipley SJ, Combrinck M, et al. Productive herpes simplex virus in brain of elderly normal subjects and Alzheimer’s disease patients. *J Med Virol.* 2005;75(2):300–306.
36. Kamal MA, Mushtaq G, Greig NH. Current Update on Synopsis of miRNA Dysregulation in Neurological Disorders. *CNS Neurol Disord Drug Targets.* 2015;14(4):492–501.
37. Carter CJ. Susceptibility genes are enriched in those of the herpes simplex virus 1/host interactome in psychiatric and neurological disorders. *Pathog Dis.* 2013;69(3):240–261.
38. Effros RB. Telomere/telomerase dynamics within the human immune system: effect of chronic infection and stress. *Exp Gerontol.* 2011;46(2–3):135–140.
39. Iourov IY, Vorsanova SG, Yurov YB. Somatic cell genomics of brain disorders: a new opportunity to clarify genetic–environmental interactions. *Cytogenet Genome Res.* 2013;139(3):181–188.
40. Martin WJ. Detection of viral related sequences in CFS patients using the polymerase chain reaction. In: Hyde BM (Ed.), *The Clinical and Scientific Basis of Myalgic Encephalomyelitis Chronic Fatigue Syndrome.* Nightingale Research Foundation Press, Ottawa, Canada, pp.1992;278.283.
41. Martin WJ, Zeng LC, Ahmed K, et al. Cytomegalovirus-related sequence in an atypical cytopathic virus repeatedly isolated from a patient with chronic fatigue syndrome. *Am J Pathol.* 1994;145(2):440–451.
42. Martin WJ. Stealth viruses as neuropathogens. *CAP Today.* 1994;8(10):67–70.
43. Martin WJ, Ahmed KN, Zeng LC, et al. African green monkey origin of the atypical cytopathic ‘stealth virus’ isolated from a patient with chronic fatigue syndrome. *Clin Diagn Virol.* 1995;4(1):93–103.
44. Martin WJ. Stealth virus isolated from an autistic child. *J Autism Dev Disord.* 1995;25(2):223–224.
45. Martin WJ. Severe stealth virus encephalopathy following chronic-fatigue-syndrome-like illness: clinical and histopathological features. *Pathobiology.* 1996;64(1):1–8.
46. Martin WJ. Stealth viral encephalopathy: Report of a fatal case complicated by cerebral vasculitis. *Pathobiology.* 1996;64(2):59–63.
47. Martin WJ. Simian cytomegalovirus related stealth virus isolated from the cerebrospinal fluid of a patient with bipolar psychosis and acute encephalopathy. *Pathobiology.* 1996;64(2):64–66.
48. Martin WJ, Anderson D. Stealth virus epidemic in the Mohave Valley. I. Initial report of virus isolation. *Pathobiology.* 1997;65(1):51–56.
49. Martin WJ, Anderson D. Stealth virus epidemic in the Mohave Valley: severe vacuolating encephalopathy in a child presenting with a behavioral disorder. *Exp Mol Pathol.* 1999;66(1):19–30.
50. Martin WJ. Stealth adaptation of viruses: Review and updated molecular analysis on a stealth adapted African green monkey simian cytomegalovirus (SCMV). *J Hum Virol Retrovirol.* 2014;1(4):00020.
51. Wills MR, Carmichael AJ, Mynard K, et al. The human cytotoxic T-lymphocyte (CTL) response to cytomegalovirus is dominated by structural protein pp65: frequency, specificity, and T-cell receptor usage of pp65-specific CTL. *J Virol.* 1996;70(11):7569–7579.
52. Martin WJ. Bacteria-related sequences in a simian cytomegalovirus-derived stealth virus culture. *Exp Mol Pathol.* 1999;66(1):8–14.
53. Pasquier F. Early diagnosis of dementia: neuropsychology. *J Neurol.* 1999;246(1):6–15.
54. Committee on the Diagnostic Criteria for Myalgic Encephalomyelitis/Chronic Fatigue Syndrome; Board on the Health of Select Populations; Institute of Medicine. *Beyond Myalgic Encephalomyelitis/Chronic Fatigue Syndrome: Redefining an Illness.* National Academies Press, Washington DC, USA. 2015;pp.304.ISBN:978–0–309–31689–7.

55. Freidenberg DL, Shaffer LE, Macalester S, et al. Orthostatic hypotension in patients with dementia: clinical features and response to treatment. *Cogn Behav Neurol*. 2013;26(3):105–120.
56. Sterniczuk R, Theou O, Rusak B, et al. Sleep disturbance is associated with incident dementia and mortality. *Curr Alzheimer Res*. 2013;10(7):767–775.
57. Vidoni ED, Honea RA, Billinger SA, et al. Cardiorespiratory fitness is associated with atrophy in Alzheimer’s and aging over 2 years. *Neurobiol Aging*. 2012;33(8):1624–1632.
58. Hubbell L, Hubbell K. The burnout risk for male caregivers in providing care to spouses afflicted with Alzheimer’s disease. *J Health Hum Serv Adm*. 2002;25(1):115–132.
59. Takai M, Takahashi M, Iwamitsu Y, et al. The experience of burnout among home caregivers of patients with dementia: relations to depression and quality of life. *Arch Gerontol Geriatr*. 2009;49(1):e1–e5.
60. Martin WJ. Stealth virus culture pigments: A potential source of cellular energy. *Exp Mol Pathol*. 2003;74(3):210–223.
61. Martin WJ. The alternative cellular energy (ACE) pathway in the repair of the cytopathic effect (CPE) caused by stealth adapted viruses: In vitro and in vivo evidence supporting a new therapeutic paradigm. In *Stealth Adapted Viruses; Alternative Cellular energy (ACE) & KELEA Activated Water*. AuthorHouse, pp.2014;31–70. ISBN 978–1–4969–0496–6.
62. Martin WJ. Complex intracellular inclusions in the brain of a child with a stealth virus encephalopathy. *Exp Mol Pathol*. 2003;74(3):197–209.
63. Martin WJ, Stoneburner J. Symptomatic relief of herpetic skin lesions utilizing an energy-based approach to healing. *Exp Mol Pathol*. 2005;78(2):131–134.
64. Martin WJ, Stoneburner J. Alternative cellular energy (ACE) pathway activation as the mode of action of neutral red dye phototherapy of human viruses. *J Hum Virol Retrovirol*. 2014;1(4):00019.
65. Martin WJ. KELEA activated water – Enhancing the alternative cellular energy (ACE) pathway. In *Stealth Adapted Viruses; Alternative Cellular energy (ACE) & KELEA Activated Water*. AuthorHouse pp.2014;115–144. ISBN 978–1–4969–0496–6.
66. Martin WJ. Therapeutic potential of KELEA activated water. *Int J Complement Alt Med*. 2015;1(1):00001.
67. Martin WJ. Do the benefits of *Moringa oleifera* trees extend to KELEA activation of water? *Adv Plants Agric Res*. 2015;2(1):00036.
68. Martin WJ. Progressive Medicine: Enhancing the alternative cellular energy (ACE) pathway. In *Stealth Adapted Viruses; Alternative Cellular energy (ACE) & KELEA Activated Water*. AuthorHouse. 2014;pp.312–314. ISBN 978–1–4969–0496–6.