

O Sun God, Savita!
 Thou dazzling fount of life-persuasive light!
 Sublimest mystery speeding from afar!
 Swift became that burst too potent on the sight!
 This radiant type of strength and youth!
 Glowing eternally!



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 Shining forth he rises from the lap of the dawn!
 Praised by singers, my God Savitar!
 Stepped forth and never missed his place!
 He steps forth the splendor of the sky the wide!
 Seeing, far-shining, the shining wanderer!
 - Rig Veda, vii. 65

He alone shines!
 All luminaries get illuminated by His Illumination!
 The whole Universe is enlightened by His light!
 - Kathapanisad

The Telangana Science Journal

Health and Nutrition

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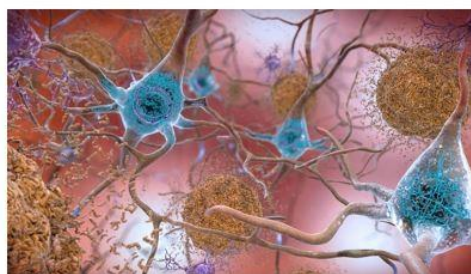
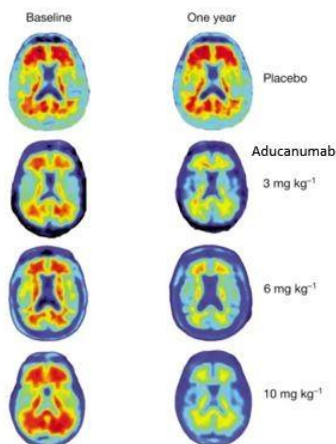
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CHASING THE MAGIC BULLET FOR AD



In the Alzheimer's affected brain, abnormal levels of the beta-amyloid protein clump together to form plaques (seen in brown) that collect between neurons and disrupt cell function. Abnormal collections of the tau protein accumulate and form tangles (seen in blue) within neurons, harming synaptic communication between nerve cells. <https://www.nih.gov>

Around 50 million people worldwide suffer from dementia¹. An estimated 5.7 million Americans have Alzheimer's disease (AD) and the number is projected to reach 14 million by 2050 and 15 million by 2060². In the past 14 years, after the **NMDA receptor inhibitor memantine** (see **Hans Jorg Moebius**) approved by the **Food and Drug Administration (FDA)** to alleviate some symptoms in 2003³, no new drugs have been approved for AD, i.e., there is no **Disease Modifying Drug (DMD)** approved for the treatment of AD so far⁴.

It is clear that winning the battle against AD must involve a cocktail of drugs directed to several targets⁵ that cause AD, and changes in lifestyle habits such as diet⁶, sleep habits and physical exercise, rather than a magic bullet, because it manifests itself in different ways among women, men, young, old, and people of different cultural, dietary, ethnic, genetic, life style, racial, social, and vocational backgrounds.

However, we seek to find the magic bullet undaunted by the commonsense and scientific rationale against such magic to capture the market of about \$236 billion a year (cost of AD in US). The quest to effectively diagnose, treat and even **prevent Alzheimer's disease** has become the intense focus of both **scientists and philanthropists** like **Bill Gates** (see **Why diagnosing Alzheimer's today is so difficult—and how we can do better**).

According to a study presented by Biogen and Eisai at the Alzheimer's Association International Conference in Chicago on 25 July 2018, an anti-amyloid antibody BAN2401 allegedly slowed the progression of the Alzheimer's disease (AD) by reducing the amount of amyloid plaque accumulated in the brain in AD patients based on the failed hypothesis that targeting the symptom of accumulation of amyloid plaques in the AD brain could hold the



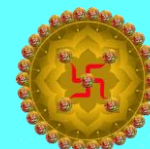
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key to fighting AD. BAN2401 caused brain swelling among 10 percent of the patients. These results are similar to that of Aducanumab that seemed to work in a yearlong study showing a significant reduction in amyloid beta and slower cognitive decline in AD patients⁷.

Based on the current state of the research, introduction of a single disease-modifying agent for the **treatment of AD** will be a miracle.



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GLOBAL EFFORT FOR HEALTH

About 4–7 million people per year die prematurely and hundreds of millions become ill from air pollution causing pain and suffering. It is estimated that about 1.5 °C rise in global temperature since preindustrial times. As dwindling fossil-fuel prices rise; economic, social, and political instability ensues unless a replacement energy infrastructure is developed well ahead of time. All of which can be eliminated by a 100% global conversion of the energy infrastructure to zero-emission energy system by 2050⁸.

Different fuels emit different amounts of various pollutants and emissions locally causing health and environmental issues globally. Different countries contribute to the global pollution differently. Therefore, it is essential to think globally and act locally⁹ to curb the pollution caused by the rich and greedy in their native habitats¹⁰ affecting every life form globally.

Individual countries are developing clean energy policies, and more than half the world's countries signed a United Nations treaty called the Paris Agreement in April 2016, agreeing to take action to limit the global pollution causing destabilization of the life and extinction of certain life forms on earth. Electricity production using energy from the sun, wind, or water for all industries, including transportation, is a key component of any clean-energy plan¹¹. The transformation of the all-purpose energy infrastructure (electricity, transportation, heating, cooling, industry, agriculture, forestry, fishing, etc.) powered by Business As Usual (BAU) power to the infrastructure powered by Wind, Water, and Sunlight (WWS) reduces all-purpose end-use load by 42.5% because the work: energy ratio of WWS electricity exceeds that of combustion(23.0%), WWS requires no mining, transporting, or processing of fuels (12.6%), and WWS end-use efficiency exceeds that of BAU (6.9%). Conversion to WWS powered infrastructure creates 24.3 million more jobs than the number of jobs lost; and avoids premature air-pollution deaths of about 4.6 million/year today and estimated deaths of about 3.5 million/year in 2050, about \$22.8 trillion/year (12.7 ¢/kWh-BAU-all-energy) in 2050 air-pollution costs, and about \$2 8.5 trillion/year (15.8 ¢/kWh-BAU-all-energy) in 2050 climate costs; stabilizes energy prices because the fuel costs are zero; reduces power disruption; increases access to energy; and avoids the estimated global pollution based temperature increase of about 1.5 °C¹².

Across the globe, cities are tackling climate change by shifting away from coal, oil, and natural gas. One hundred-sixty-two cities like Reykjavik and Zurich have already quit using fossil fuels to produce power, and others plan to cut back^{13,14}. In US, Aspen in Colorado, Greensburg in Kansas, Burlington in Vermont, Kodiak Island in Alaska, and Rock Port in Missouri have successfully made the switch to 100 percent renewables¹⁵ by boosting clean power sources¹⁶ and eliminating fossil fuels which produce pollution¹⁷ including CO₂¹⁸.



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- Defining and labeling disease-modifying treatments for Alzheimer's disease, Alzheimer's & Dementia, Volume 5, Issue 5, Pages 406-418 (September 2009) "Disease modification can be defined as treatments or interventions that affect the underlying pathophysiology of the disease and have a beneficial outcome on the course of AD. In a clinical trial the criteria for affecting the underlying cause of the disease can be supported by demonstrating an effect on a biomarker such as medial temporal atrophy on magnetic resonance imaging (MRI) or diminished tau or phospho-tau levels in cerebrospinal fluid. The claim for a beneficial effect on the clinical course of AD is supported by a drug-placebo difference on the primary clinical outcomes of the clinical trial. A statistically significant correlation between the biomarker outcome and the clinical trial outcome would support the claim that these are based on the same underlying mechanism." Researchers Just Proposed a Radical New Way of Defining Alzheimer's. Could It Lead to Better Drugs? <http://fortune.com/2018/04/10/new-alzheimers-framework-drugs/>
- Several disease-modifying therapeutic strategies for AD have emerged so far. Just a few to name: Eisai and Biogen's oral BACE inhibitor elenbecestat was able to demonstrate a reduction in amyloid beta levels in AD patients- the first time a BACE inhibitor to show a significant effect on amyloid beta levels in patients, but it failed to slow the decline of clinical symptoms. Janssen terminated trials of atabacestat. Merck halted a phase 3 trial of verubecestat. Meanwhile, Novartis, Amgen and Banner Alzheimer's Institute launched a global prevention program using the BACE inhibitor CNP520. Novartis, Amgen and Banner aim for Alzheimer's prevention with new BACE trials <https://www.fiercebitech.com/biotech/eisai-biogen-s-bace-drug-lowers-amyloid-levels-but-not-alzheimer-s-symptoms>; Scientists found that reduced levels of a protein called Rheb result in spontaneous symptoms of memory loss linked to increased levels of BACE1 protein known to be elevated in the brains of Alzheimer's disease patients. Forebrain Rheb depletion promotes aging-associated cognitive defects. Forebrain Depletion of Rheb Elicits Spatial Memory Deficits in Mice. *Neurobiology of Aging*, 2016; DOI: 10.1016/j.neurobiolaging.2016.11.006; <https://www.sciencedaily.com/releases/2016/12/161207160040.htm> Ephexin5 protein appears to be elevated in the brain cells of AD patients and removing it prevents Alzheimer's characteristic memory losses. Reducing expression of synapse-restricting protein Ephexin5 ameliorates Alzheimer's-like impairment in mice. Journal of Clinical Investigation, 2017 <https://www.jci.org/articles/view/85504>; <https://www.sciencedaily.com/releases/2017/03/170327172823.htm> Human beta-secretase (BACE) and BACE inhibitors: progress report <https://www.ncbi.nlm.nih.gov/pubmed/16712492> A number of agents are studied so far, e.g., γ -secretase inhibitors such as Semagacestat (LY450139), and β -secretase inhibitors such as CTS-21166 (CoMentis), PF-05297909 (Pfizer), LY2886721 (Lilly), AZD3293 (AstraZeneca), MK-8931 (Merk), etc.; α -secretase stimulators, muscarinic receptor 1 (M1) agonists, and selective A β 42-lowering agents (SALA); A β 42 aggregation blockers, e.g., Tramiprosate, Clioquinol, PBT2, Colostriatin, anti-A β 42 antibodies such as Gantenerumab, Solanezumab, Bapinezumab, etc.; Tau phosphorylation and aggregation inhibitors such as GSK-3 inhibitors and antibodies; nerve growth factor (NGF) stimulators, e.g. leteprenim, xaliprofen; gamma aminobutyric acid (GABA) receptor modulators, e.g. SGS-742, NGD-97-1, AC 3933; serotonin reuptake and somatostatin secretion stimulants, e.g. FK 960; astrocyte-modulating agents (ONO 2506), phosphodiesterase 4 inhibitors (MK 0952), and cannabinoid agonists (AVE-1652)



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New Therapeutic Targets in Alzheimer's

Disease <https://reader.elsevier.com/reader/sd/8DB9B2467E738BC32A688DAE896993DCADD1514B54AECF5C0D5761DEE8CA9D160CCFEED9A425747B7A12751F548CA04B> <https://www.sciencedirect.com/science/article/pii/S1873959817300224>

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Neuropsychiatric signs and symptoms of Alzheimer's disease: New treatment paradigms, Alzheimer's & Dementia: Translational Research & Clinical Interventions 3 (2017) 440-449 [https://www.trci.alzdem.com/article/S2352-8737\(17\)30045-8/fulltext](https://www.trci.alzdem.com/article/S2352-8737(17)30045-8/fulltext)

Current and novel therapeutic molecules and targets in Alzheimer's disease, Journal of the Formosan Medical Association, 115, 3e10 (2016) <http://dx.doi.org/10.1016/j.jfma.2015.04.001>

Alzheimer's disease therapies: Selected advances and future perspectives Alexandria Journal of Medicine, 51, 1-3 (2015) <http://www.elsevier.com/locate/ajme>

Why Alzheimer's Drugs Keep Failing - Scientific American

Subjective Cognitive Decline (SCD) in individuals with unimpaired performance on cognitive tests may represent the first symptomatic manifestation of Alzheimer's disease (AD) (see Subjective Cognitive Decline (SCD) at <https://www.linkedin.com/pulse/subjective-cognitive-decline-scd>).

⁶Alzheimer's disease risk impacted by the liver, diet: Research shows the liver could contribute to Alzheimer's risk by failing to supply key lipids to the brain <https://www.sciencedaily.com/releases/2018/07/180724174225.htm>

Plasmalogens are created in the liver and are dispersed through the blood stream in the form of lipoproteins, which also transport cholesterol and other lipids to and from cells and tissues throughout the body, including the brain. Reduced levels of plasmalogens are associated with an increased risk of Alzheimer's Disease. ScienceDaily, 24 July 2018

⁷Clinical Trial Breakthrough for New Alzheimer's Drug | Fortune

New Alzheimer's drug may slow decline, researchers report - NBC News

Trial of new Alzheimer's drug shows promising results THE WASHINGTON POST

New Alzheimer's drug shows hints of promise in inventive trial - Science

Alzheimer's: New hope for drug, but it's still early - CNN

New Alzheimer's Drug Shows Big Promise in Early Trial Results - The NY TIMES

⁸ 100% Clean and Renewable Wind, Water, and Sunlight All-Sector Energy Roadmaps for 139 Countries of the World

<https://reader.elsevier.com/reader/sd/9CCD712690495420304BB0D2D7D1F3EC71E05D26B37A25E81CEE32B638AA38F168978E135FD33154031DF448F3591406>

⁹ The term "think global, act local" was first used by the environmental movement in the 1960s and 70s. It referred to the need to be aware about world-wide environmental issues such as pollution, and then to take action to address these issues by making changes in local household and community, which even more relevant in the flattened, interconnected, 21st century global community where human rights; income inequality and poverty alleviation; gender equality; free and open Internet access; sustainable development; terrorism; freedom of movement and immigration; anti-globalization in the form of nationalism, isolationism and xenophobia; prevention and cessation of conflicts between countries; elimination of weapons of mass destruction; and other innumerable known, knowable, and unknown issues; along with the persistent diffused global pollution caused locally by the rich industrialized countries followed by the poor countries aspiring to bring the life-style of the rich to the local poor.

[THINKING GLOBALLY, ACTING LOCALLY REVISITED](http://www.theglobalcitizensinitiative.org/thinking-globally-acting-locally-revisited/) <http://www.theglobalcitizensinitiative.org/thinking-globally-acting-locally-revisited/>; [What is Think Global, Act Local?](https://simplicable.com/new/think-global-act-local) <https://simplicable.com/new/think-global-act-local>; [Think Globally, Act Locally](https://medium.com/@joshuashawnmichaelhehe/think-globally-act-locally-6bea042dbd24) <https://medium.com/@joshuashawnmichaelhehe/think-globally-act-locally-6bea042dbd24>; [Encouraging communities to think globally and act locally](https://www.unv.org/our-stories/encouraging-communities-think-globally-and-act-locally) <https://www.unv.org/our-stories/encouraging-communities-think-globally-and-act-locally>; [IN BUSINESS, THINK GLOBALLY AND ACT LOCALLY MEANS LANGUAGE TRAINING](http://www.rosettastone.co.uk/blog/in-business-think-globally-and-act-locally-means-language-training/) <http://www.rosettastone.co.uk/blog/in-business-think-globally-and-act-locally-means-language-training/>; [Why You Should Think Global, Act Local](http://www.sustainablebabysteps.com/think-global-act-local.html) <http://www.sustainablebabysteps.com/think-global-act-local.html>

¹⁰ [Thinking Locally, Acting Globally?](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3828730/pdf/AJPH.2013.301636.pdf) <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3828730/pdf/AJPH.2013.301636.pdf>

¹¹ [A Global Transition to Clean Energy: Challenges and Opportunities](https://images.magnetmail.net/images/clients/ACS1/attach/eBooks/2018_Clean_Energy_Report.pdf)

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¹² [100% Clean and Renewable Wind, Water, and Sunlight All-Sector Energy Roadmaps for 139 Countries of the World](https://reader.elsevier.com/reader/sd/9CCD712690495420304BB0D2D7D1F3EC71E05D26B37A25E81CEE32B638AA38F168978E135FD33154031DF448F3591406)
<https://reader.elsevier.com/reader/sd/9CCD712690495420304BB0D2D7D1F3EC71E05D26B37A25E81CEE32B638AA38F168978E135FD33154031DF448F3591406>

¹³ [Which Cities In the World Are Closest to Nixing Fossil Fuels?](https://news.nationalgeographic.com/energy/2015/09/150917-which-cities-are-closest-to-nixing-fossil-fuels/) <https://news.nationalgeographic.com/energy/2015/09/150917-which-cities-are-closest-to-nixing-fossil-fuels/>

¹⁴ Nunez, C. "Portugal Ditched Fossil Fuel Power for 4 Days. Can We Go Longer?"
 National Geographic (web date May 27, 2016); available online at <http://news.nationalgeographic.com/energy/2016/05/portugal-100-percent-renewable-energy-windsolar-hydroelectric/>; <https://news.nationalgeographic.com/energy/2015/09/150917-which-cities-are-closest-to-nixing-fossil-fuels/>

¹⁵ [These 5 US Towns Are Powered Entirely By Renewable Energy](https://www.huffingtonpost.com/entry/american-cities-powered-by-renewable-energy_us_59ea2cbee4b0958c4681d32a) https://www.huffingtonpost.com/entry/american-cities-powered-by-renewable-energy_us_59ea2cbee4b0958c4681d32a; [Aspen is third US city to reach 100 percent renewable energy](https://www.denverpost.com/2015/09/08/aspden-is-third-u-s-city-to-reach-100-percent-renewable-energy/) <https://www.denverpost.com/2015/09/08/aspden-is-third-u-s-city-to-reach-100-percent-renewable-energy/>; [Chicago Is Fighting Climate Change No Matter What Trump Says](https://www.boston.com/news/energy-environment/2015/09/08/chicago-is-fighting-climate-change-no-matter-what-trump-says)
[Houston Will Get Hit With Another Harvey. Now's The Time For It To Prepare](https://www.boston.com/news/energy-environment/2015/09/08/chicago-is-fighting-climate-change-no-matter-what-trump-says)

¹⁶ [Solar Could Beat Coal to Become the Cheapest Power on Earth](https://www.bloomberg.com/news/articles/2017-01-03/for-cheapest-power-on-earth-look-skyward-as-coal-falls-to-solar) <https://www.bloomberg.com/news/articles/2017-01-03/for-cheapest-power-on-earth-look-skyward-as-coal-falls-to-solar>;
[An entirely renewable energy future is possible, a new study says](https://www.pri.org/stories/2017-09-09/entirely-renewable-energy-future-possible-new-study-says) <https://www.pri.org/stories/2017-09-09/entirely-renewable-energy-future-possible-new-study-says>; [Running The Numbers On A Transition To Renewable Energy](https://www.sciencefriday.com/segments/running-the-numbers-on-a-transition-to-renewable-energy/) <https://www.sciencefriday.com/segments/running-the-numbers-on-a-transition-to-renewable-energy/>

¹⁷ [100% Clean and Renewable Wind, Water, and Sunlight All-Sector Energy Roadmaps for 139 Countries of the World](https://www.pri.org/stories/2017-09-09/entirely-renewable-energy-future-possible-new-study-says)
<https://reader.elsevier.com/reader/sd/9CCD712690495420304BB0D2D7D1F3EC71E05D26B37A25E81CEE32B638AA38F168978E135FD33154031DF448F3591406>



¹⁷ [Are you wasteful or resourceful?](https://www.rt.com/shows/big-picture/424755-earth-day-world-resources/) <https://www.rt.com/shows/big-picture/424755-earth-day-world-resources/> : Conservation with biologist & author Dr. Reese Halter, Earth Doctor, a voice for bees, trees, and seas.

¹⁸ [How much carbon dioxide is produced when different fuels are burned?](https://www.eia.gov/tools/faqs/faq.php?id=73&t=11) <https://www.eia.gov/tools/faqs/faq.php?id=73&t=11>
 Different fuels emit different amounts of carbon dioxide (CO₂) in relation to the energy they produce when burned. To analyze emissions across fuels, compare the amount of CO₂ emitted per unit of energy output or heat content.

Pounds of CO₂ emitted per million British thermal units (Btu) of energy for various fuels:

Coal (anthracite)	228.6
Coal (bituminous)	205.7
Coal (lignite)	215.4
Coal (subbituminous)	214.3
Diesel fuel and heating oil	161.3
Gasoline (without ethanol)	157.2
Propane	139.0
Natural gas	117.0

	Pounds CO ₂	Kilograms CO ₂	Pounds CO ₂	Kilograms CO ₂
Carbon Dioxide (CO ₂) Factors:	Per Unit of Volume or Mass	Volume or Mass	Million Btu	Million Btu

For homes and businesses



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Propane	12.70/gallon	5.76/gallon	139.05	63.07
Butane	14.80/gallon	6.71/gallon	143.20	64.95
Butane/Propane Mix	13.70/gallon	6.21/gallon	141.12	64.01
Home Heating and Diesel Fuel (Distillate)	22.40/gallon	10.16/gallon	161.30	73.16
Kerosene	21.50/gallon	9.75/gallon	159.40	72.30
Coal (All types)	4,631.50/short ton	2,100.82/short ton	210.20	95.35
Natural Gas	117.10/thousand cubic feet	53.12/thousand cubic feet	117.00	53.07
Gasoline	19.60/gallon	8.89/gallon	157.20	71.30
Residual Heating Fuel (Businesses only)	26.00/gallon	11.79/gallon	173.70	78.79
Other transportation fuels				
Jet Fuel	21.10/gallon	9.57/gallon	156.30	70.90
Aviation Gas	18.40/gallon	8.35/gallon	152.60	69.20
Industrial fuels and others not listed above				
Flared natural gas	120.70/thousand cubic feet	54.75/thousand cubic feet	120.60	54.70
Petroleum coke	32.40/gallon	14.70/gallon	225.10	102.10
Other petroleum & miscellaneous	22.09/gallon	10.02/gallon	160.10	72.62
Nonfuel uses				
Asphalt and Road Oil	26.34/gallon	11.95/gallon	166.70	75.61
Lubricants	23.62/gallon	10.72/gallon	163.60	74.21
Petrochemical Feedstocks	24.74/gallon	11.22/gallon	156.60	71.03
Special Naphthas (solvents)	20.05/gallon	9.10/gallon	160.50	72.80
Waxes	21.11/gallon	9.57/gallon	160.10	72.62
Coal by type				
Anthracite	5,685.00/short ton	2,578.68/short ton	228.60	103.70
Bituminous	4,931.30/short ton	2,236.80/short ton	205.70	93.30
Subbituminous	3,715.90/short ton	1,685.51/short ton	214.30	97.20



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Lignite	2,791.60/short ton	1,266.25/short ton	215.40	97.70
Coke	6,239.68/short ton	2,830.27/short ton	251.60	114.12
Other fuels				
Geothermal (average all generation)	NA	NA	16.99	7.71
Municipal Solid Waste	5,771.00/short ton	2,617.68/short ton	91.90	41.69
Tire-derived fuel	6,160.00/short ton	2,794.13/short ton	189.54	85.97
Waste oil	924.0/barrel	419.12/barrel	210.00	95.25

Source: U.S. Energy Information Administration estimates.

Note: To convert to carbon equivalents multiply by 12/44. Coefficients may vary slightly with estimation method and across time.

¹⁹ <https://www.rt.com/search?q=climate+change&type=>

One World One Family
 AUM! SWASTI!

Om! Asatoma Sadgamaya, Tamasoma Jyotirgamaya, Mrityorma Amritamgamaya, Om Shantih, Shantih, Shantih! (Aum! Lead the world from wrong path to the right path, from ignorance to knowledge, from mortality to immortality, and peace!)

SWASTI! AUM!



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