

The Case For Resveratrol

Why Aren't More Americans Taking Resveratrol Pills?

by Bill Sardi

Table of Contents

- Part I The Evidence For Resveratrol**
- Part II The Secret Of How Resveratrol Works**
- Part III Questions To Ask When Purchasing Resveratrol Pills**
- Part IV Do Resveratrol Pills Have A Future?**

“Ask not what resveratrol can do; ask rather, what resveratrol cannot do.”

*--D. M. Goldberg and G.J. Soleas, Resveratrol: biochemistry, cell biology
and the potential role in disease prevention, in Wine, A Scientific Exploration,
Sandler and Pinder, Taylor & Francis, New York, 2003.*

PART I**THE EVIDENCE FOR RESVERATROL****Introduction**

It is striking that more Americans don't take resveratrol pills. After all, America is a nation of pill poppers. The average 60-year old American is taking five prescription drugs a day and is also likely to swallow down a multivitamin, fish oil capsules, vitamins C & D tablets and maybe a calcium pill every day. So you don't have to work too hard to get Americans to take pills. They love them.

However, in an era where public information is easily and widely disseminated electronically, a great discovery has been overlooked by the public. That discovery involves yet another pill that could replace most of the others.

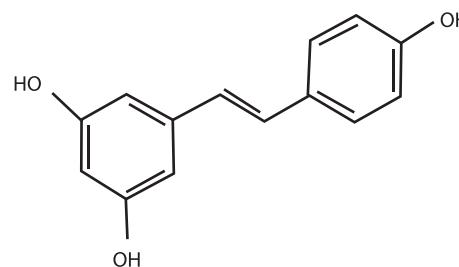
This report attempts to present the most convincing evidence for resveratrol. Man-made drugs, most designed to target a cell surface receptor or a particular disease gene, are self-limiting by their very definition. Whereas small molecules found in nature, particularly a class of molecules called polyphenols found in spices, berries, onions

and grapes, can penetrate through cell walls, influence genetic machinery inside the cell and target hundreds of genes and essentially address many diseases.

Resveratrol, known as a red wine molecule, is such a miracle molecule, likened to the “*magic bullet*” that penicillin became decades earlier.

So what do resveratrol pills really do? And how do they work? Graphic answers to those questions are about to be revealed below.

So precisely what does resveratrol do for you?



Resveratrol molecular structure
Molecular weight: 228 Daltons

Resveratrol (*pronounced rez-vair-ah-trol*), best known as a red wine molecule, is a matchless and distinctive molecule for human health and longevity. You may or may not have heard about it. Most likely you have heard about the life-prolonging effect of red wine, as demonstrated among the French who consume a fairly high fat/cholesterol diet yet have the most centenarians per capita of any country in the world. That phenomenon is called [The French Paradox](#).

Resveratrol is not a complex molecule. It is simple and small (molecular weight of 228 Daltons), is easily absorbed and able to pass through cells walls and influence genetic machinery inside living cells. Other molecules found in red wine, such as quercetin, ferulic acid and catechin, molecularly resemble resveratrol, but they are not its equal.

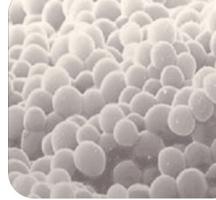
Resveratrol: one molecule for all diseases

A presumption by modern medicine is that pharmacologists can design molecules better than nature and make them into patentable drugs that can better target specific disease genes. But single-gene targeted drugs have been a disappointment.

One drug company that initially began investigation of a resveratrol drug promised to come up with more powerful synthetic molecules that would mimic a calorie-restricted diet. The “*new chemical entities*” that company promised never materialized.

In recent times biologists have come to recognize that diseases, and aging itself, involve many genes.

A distinctive feature of resveratrol is its ability to influence many genes, and therefore many diseases, including aging itself. As one researcher put it, “resveratrol unleashes a genetic tsunami.”

Progression of Longevity Studies In Increasingly Higher Life Forms Using Resveratrol							
1992	2003	2004	2004	2006	2006	2008	2008
							
Humans Red Wine <i>Vitis vinifera</i>	Yeast Cells <i>Saccharomyces cerevisiae</i>	Fruit Fly <i>Drosophila melanogaster</i>	Roundworm (vertebrate) <i>Caenorhabditis elegans</i>	Killifish (vertebrate) <i>Nothobranchius furzeri</i>	Rodents Over-fed high fat diet	Rodents Normal-fed standard diet	Rodents Longevinex® Global Gene Array Study
Unprecedented Longevity	Increased Lifespan 60%	Increased Lifespan 29%	Increased Lifespan 15%	Increased Lifespan 27-59%	Increased Lifespan 31%	Slightly Decreased Lifespan	Switched 677 of 831 longevity genes in same direction as CR¹
Serge Ranaud "French Paradox"	David Sinclair & Colleagues Harvard	S.L. Helfand & Colleagues Univ. CT	David Sinclair & Colleagues Harvard	L. Domenici & Colleagues Italy	Baur, Sinclair	Pearson, Sinclair, de Cabo	Weindruch, Prolla et al Lifegen
Novartis Foundation Symposium 216: 208, 1998	<i>Nature</i> 425: 191-96, 2003	<i>Proc National Academy Science</i> 101: 1280, 2004	<i>Nature</i> 430: 686, 2004	<i>Current Biology</i> 16: 296, 2006	<i>Nature</i> 444: 337-42, 2006	<i>Cell Metabolism</i> 8: 157-68, 2008	<i>Experimental Gerontology</i> 43: 859-66, 2008

¹CR = Calorie Restriction

Whereas modern pharmacology represents single man-made molecules that address a sole disease, resveratrol represents a single natural molecule that addresses many diseases at one time. Its broad biological action suggests it could mount a formidable threat to modern pharmacology and replace or augment many prescription drugs now in use. Here is a list:

Biological Action of Resveratrol – Similar To Many Drugs

Biological Action/ Drug Class	Generic/name (brand name) drug resveratrol would replace	Evidence PubMed ID
Anti-inflammatory		
COX-2 inhibitor	Ibuprofen (Advil, Motrin) Naproxen)(Aleve), Indomethacin (Indocin) Cox-2 inhibitors Celecoxib (Bextra), Rofecoxib (Vioxx), others	PMID: 20132809 PMID: 20534755 PMID: 15364641
C-reactive protein inhibitor	CRPRx	
TNF inhibitor	Etanercept (Enbrel)	
Pain blockers (opoids, morphine)	Fentanyl (Duragesic), Oxycodone (Oxycontin), Hydrocodone (Vicodin)	MID: 18814970 PMID: 15632951
Antibiotic		
Anti-bacterial	Penicillin, Tetracycline (Vibramycin), others	PMID: 19933041 PMID: 20074034
Anti-viral	Acyclovir (Zovirax), Oseltamovir (Tamiflu), Zanamivir (Relenza), Interferon, others	

Biological Action/ Drug Class	Generic/name (brand name) drug resveratrol would replace	Evidence PubMed ID
Antidepressant	MAO inhibitors, Serotonin reuptake inhibitors, such as Fluoxetine (Prozac), Paroxetine (Paxil), Zoloft (Sertraline)	PMID: 20353885
Anti-cholesterol	Statin drugs: atorvastatin (Lipitor), fluvastatin (Lescol), rosuvastatin (Crestor), simvastatin (Zocor), others	PMID: 17188708 PMID: 21052791
Anti-blood clotting	Coumadin, Warfarin	PMID: 21450376
Anti-angiogenic (inhibits abnormal blood vessel formation)	Bevacizumab (Avastin), ranibizumab (Lucentis)	PMID: 21282584 PMID: 20671276
Alzheimer's drugs (acetacholinesterase inhibitors)	Tacrine (Cognex) Donepezil (Aricept)	PMID: 19303406
Circulation enhancement	Pentoxyfilline (Trental)	PMID: 17367797
Hormone replacement		
T-3 (thyroid) T	Synthroid	PMID: 16570238
estosterone	Andro Gel	PMID: 18277612 PMID: 19800779
Acts like weak estrogen	Prempro	
Prevents or limits heart attacks (cardioprotection)	Aspirin	PMID: 21203465 PMID: 21076489
Anti-blood pressure	ACE inhibitors: enalapril (Vasotec), lisinopril (Lopril), others	PMID: 21640096 PMID: 21411770

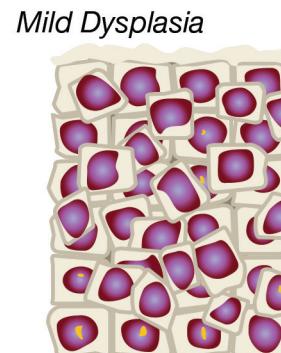
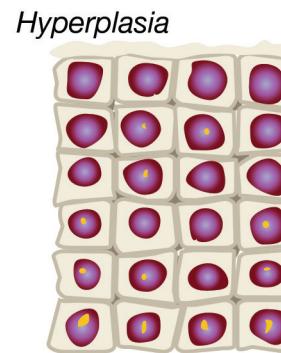
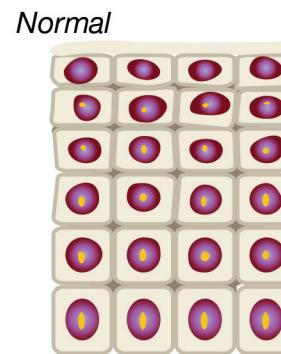
Biological Action/ Drug Class	Generic/name (brand name) drug resveratrol would replace	Evidence PubMed ID
Vasodilators (blood vessel-widening agents ; anti-angina drugs)	Nitroglycerin (Nitro-bid) Sildenafil (Viagra)	PMID: 20357044 PMID: 20596084
Aromatase inhibitors (breast cancer)	Anastrozole (Arimidex) Letrozole (Femara)	PMID: 16611627 PMID: 18423413
Prostate cancer (5-alpha reductase inhibitors)	Finasteride (Proscar)	PMID: 21629831
Anti-osteoporosis (bisphosphonates)	Raloxifene (Evista)	PMID: 21713995 PMID: 16964405

Resveratrol and the big C

No single molecule, natural or man-made, has been proven to cure cancer. Most cancer chemotherapy consists of multiple drugs. But then again, there is resveratrol.

It was a breathtaking moment in the history of medicine. It is nearly forgotten now, but momentarily relived for readers here. A researcher had been dispatched across the globe to test and examine over 30,000 natural molecules for their ability to quell cancer. Unexpectedly, [one molecule stood out from the rest](#).

Pre-cancerous States Begin With Gene Mutations



John Pezzuto PhD, the researcher who traveled thousands of miles for the National Cancer Institute to put these natural molecules to the test, said: “*Of all the plants we've tested for cancer chemo-preventive activity and all the compounds we've seen, this one has the greatest promise.*”

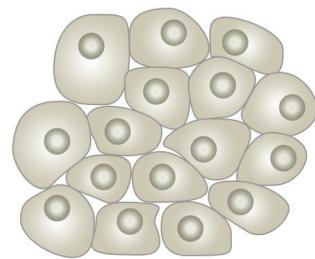
Resveratrol [blocks all three stages of cancer](#) genesis: initiation, promotion and progression. No anti-cancer drug comes even close to doing this. Resveratrol may be as close as biologists will ever come to [a singular cure for cancer](#). Oddly, even though resveratrol has been demonstrated in numerous studies to help [overcome cancer drug resistance](#) and to quell cancer itself, it is not even used as a secondary medication in cancer therapy today.

According to Dr. Pezzuto, a recent research study involving resveratrol showed that it switched hundreds of genes at one time. Commenting on that study, Dr. Pezutto likened resveratrol to a “*whiff that induces a biologically specific tsunami.*” Those are strong words from a usually reserved investigator.

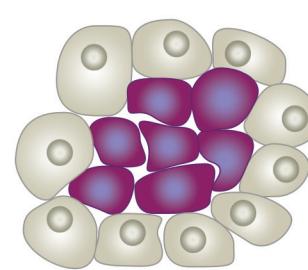
[Others also extol this molecule](#): “*The remarkable message is that exquisitely low daily doses of resveratrol (between 14 and 140 mg in a 160 pound human) will suffice to exert potent cancer chemopreventive efficacy and pharmacodynamic activity. These animal studies render resveratrol one of the most potent diet-derived chemopreventive dietary polyphenols ever described.*” -- Andreas J, Gescher and William P Steward, Department of Oncology, Leicester, United Kingdom, in *Cancer Epidemiology, Biomarkers and Prevention*, 2003; 12: 953-57.

Resveratrol Blocks All Developmental Stages Of Cancer

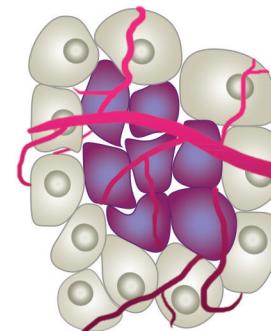
Growth



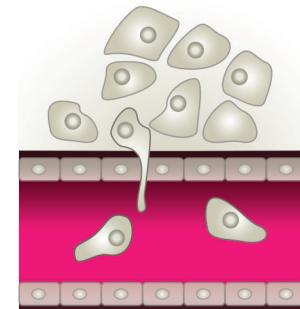
Survival



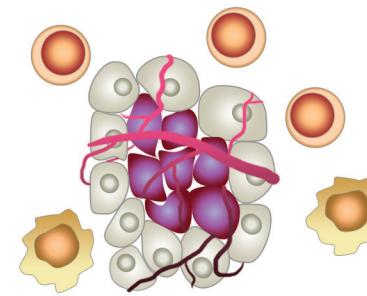
Angiogenesis



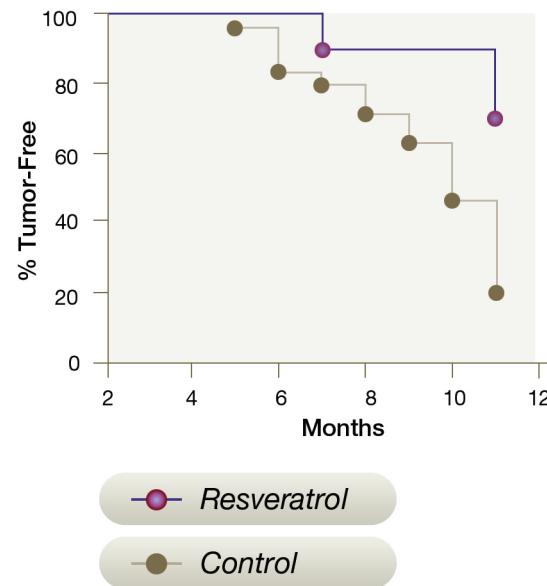
Invasion



Inflammation



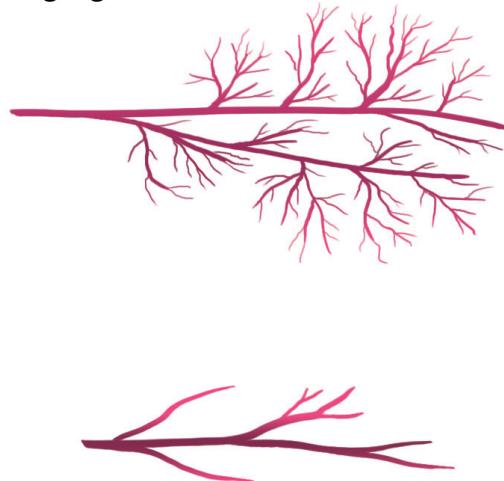
Resveratrol treated animals



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Look at what resveratrol did in the animal lab (see chart on left). These animals were bred to develop cancer. Resveratrol-treated animals remained completely tumor-free for 7 months and by the 10-month point 90% of resveratrol-treated animals were tumor free compared to ~40% of untreated animals.

Angiogenesis

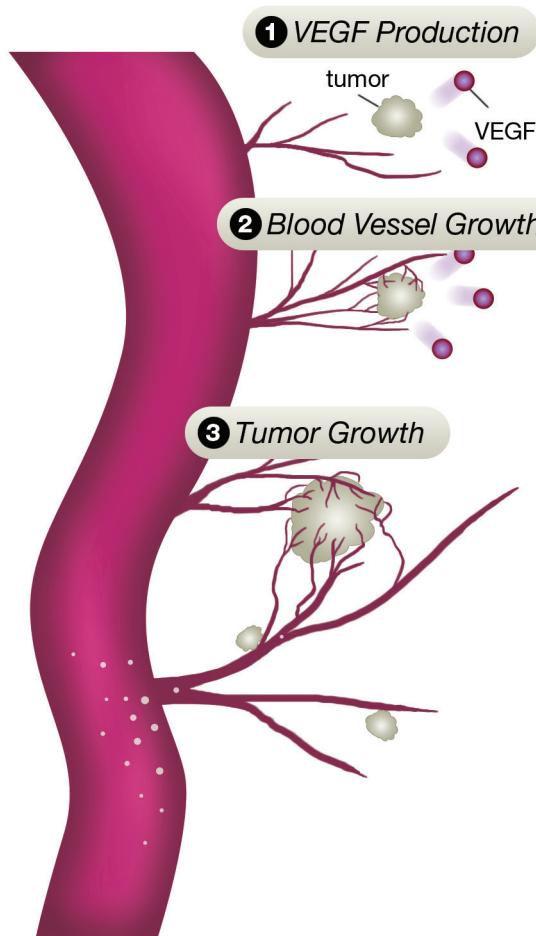
Cancer, angiogenesis and resveratrol

In the [1970s](#) Dr. Judah Folkman pioneered a strategy to shrink solid tumors by causing the newly outcropped blood vessels that feed them to recede. His work was heralded on the front page of The New York Times. “*We will cure cancer in our time*” was the thrust of Folkman’s work. Researchers really began thinking cancer could be cured outright. Nobel Prize winner Dr. James Watson, co-discoverer of the DNA double helix, said: “[*Judah \[Folkman\] is going to cure cancer in two years.*](#)” Watson later denied he said this, but the frenzy for a cancer cure had begun.

Tumor cells become oxygen starved (hypoxic), which triggers hypoxia inducing factor (HIF) which regulates how cells respond to low oxygen conditions, and a protein called vascular endothelial growth factor (VEGF) that weakens surrounding blood vessels and creates new branches that deliver nutrients to the tumor site. This outcropping of new blood vessels is known as angiogenesis. Dr. Folkman called this the “[*Achilles heel of cancer.*](#)” It is a part of the normal wound healing process. After a wound heals, these new blood vessels recede. In cancer, they remain. The tumor grows and an exit pathway is created for tumor cells to spread and grow elsewhere (metastasis).

Monoclonal antibody drugs were developed (example: *Avastin*) that block VEGF and stop angiogenesis, but have been disappointing, [only adding a few months to sur-](#)

Tumor growth



vival. That is because tumors involve more than just HIF and VEGF. Once again, narrowly targeted drugs fail. Eventually natural resistance to anti-angiogenic treatment occurs.

Researchers suggest [anti-cancer agents that address broader pathways](#) would be more efficacious. Resveratrol fits that specification because [it not only inhibits HIF and VEGF, but most other biological pathways involved in cancer](#). PMID: 21291372 There is no man-made anti-cancer drug that can compare to resveratrol.

In a recent study conducted by researchers at the National Institutes of Health, resveratrol exerted a strong influence over microRNA that control genes involved in angiogenesis, and a commercially available brand of resveratrol, *Longevinex®*, that employs synergistic molecules, far exceeded that. The study was performed in laboratory animals to determine gene response after a heart attack. While the study did not involve cancer, it did reveal the potential for resveratrol, and more so for *Longevinex®*, to control a broad number of gene targets, especially those involved in angiogenesis, via microRNA.

So here is incontrovertible evidence that resveratrol, and more so *Longevinex®*, may be the most profound anti-cancer agents, at least in the animal lab, ever discovered, yet they are ignored because they do not fit into the system of creating patentable molecules that are narrowly targeted at specific genes and diseases.

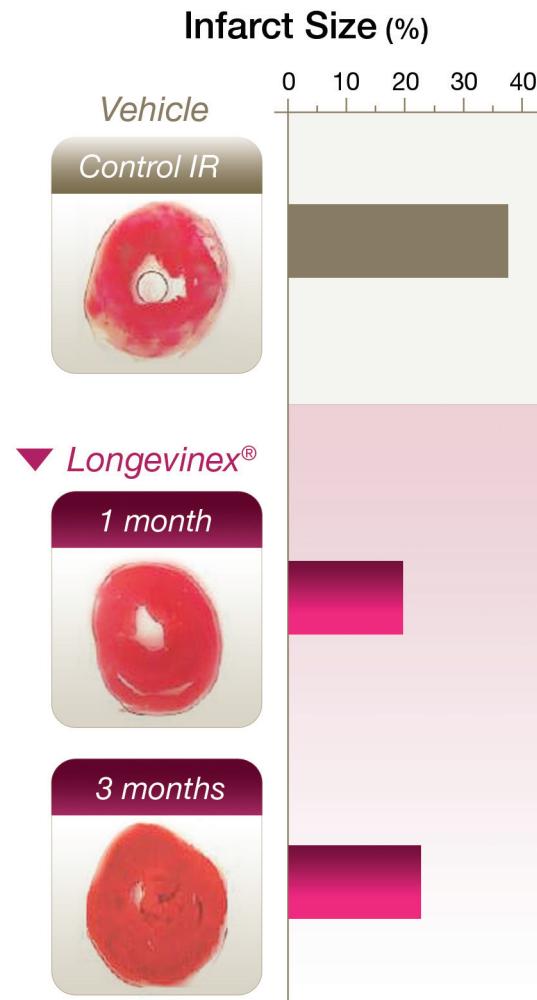
Influence Of Resveratrol Over New Blood Vessel Formation (Angiogenesis) In Rodent Heart

MicroRNA	Post Heart Attack No treatment	Post Heart Attack RESVERATROL	Post Heart Attack LONGEVINEX®
MicroRNA-539	+214.3	+172.4	+ 314.6
MicroRNA-20b (Controls HIF-1 hypoxia factor and VEGF growth factor)	- 112.9	-189.0	-1366.6
MicroRNA-21	-4.0	+61.5	+59.3

Source: Restoration of Altered MicroRNA Expression in the Ischemic Heart with Resveratrol, PLoS ONE, Dec. 2010 PMID: 21203465

It has already been demonstrated in humans that *Longevinex®* causes new blood vessels to rapidly recede in the retina, which is a model for cancer. So it is tempting to say, as Judah Folkman once did, that a cancer cure is within reach. While it takes 5 years to determine if any anti-cancer agent prolongs survival in humans, given there are only failed treatments and no present cures for cancer, one would think oncologists would be racing to employ resveratrol at least on a compassionate use basis. Instead, the rush towards resveratrol as a cancer remedy is almost nil. While cancer

Infarct size in rodent heart



researchers write about using resveratrol in human cancer trials, [claiming they need more safety data](#) and a greater understanding of its mechanisms, the fact is, resveratrol is far safer than the current drugs used to treat cancer.

Sudden mortal heart attacks and resveratrol

Then there is that other dreaded mortal disease in the arteries --- and unlike cancer, it often strikes suddenly and takes life away before anything can be done about it. Sudden mortal heart attacks are often the first sign that a person has arterial disease. There is little that can be done to avert sudden mortal heart attacks aside from a daily aspirin tablet, which frankly isn't working because the baby-sized aspirin (81 mg) is ineffective at preventing blood clots in any of the four coronary arteries that feed the heart with oxygenated blood, and [the standard-sized aspirin tablet \(325 mg\) often produces bleeding gastric ulcers that can be mortal in themselves](#).

Resveratrol doesn't play second fiddle to aspirin when it comes to sudden mortal heart attacks. Dipak Das PhD at the University of Connecticut has spent more than two decades studying a phenomenon called cardioprotection – how to switch on defenses in the heart prior to a heart attack so that the event won't be mortal. Resveratrol shines here again.

When rodent hearts are surgically excised and stabilized to pump for four hours in the laboratory, and then subjected to a heart attack by blockage of a coronary artery,

the heart will sustain little damage (less scarring) and keep on beating if resveratrol is provided. In other words, resveratrol turns an otherwise mortal heart attack into a non-mortal event. This striking discovery goes unused in modern medicine today. An important part of this discovery is that relatively low doses of resveratrol protect the heart, but mega-doses would make a heart attack worse. More heart muscle tissue would be scarred if mega-doses were employed. In other words, more resveratrol is not better.

Now if you are waiting for human studies to prove this, well, it would be unethical to attempt to duplicate this in humans. The science on cardioprotection may not get any better than this. The public has to begin taking resveratrol pills and retrospective studies ensue, like what was done with aspirin. The public is currently misled that a baby aspirin will prevent a mortal heart attack. Resveratrol stands at the ready. Few have begun to take resveratrol pills and cardiology is remiss in not prescribing it for high-risk patients.

Resveratrol and blindness

Resveratrol has great promise to conquer blindness. The most devastating and prevalent form of vision loss with advancing age is the invasive form of macular degeneration. It is a scourge of old age.

Sensing a lack of oxygen (hypoxia) at the back of the eyes due to poor circulation with advancing age, the retina forms new blood vessels that invade the visual center of the eyes. This is called “wet” macular degeneration.

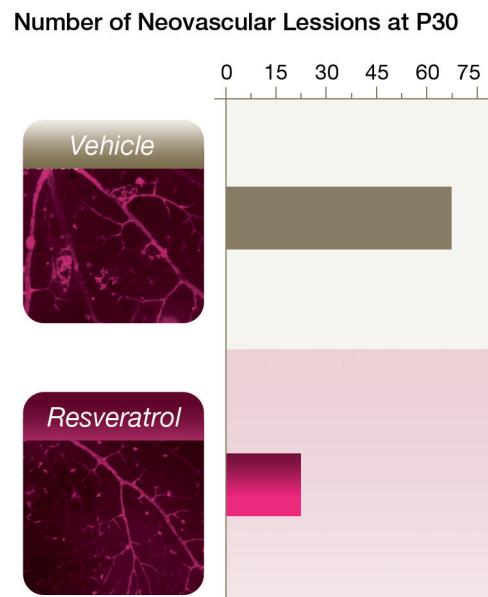
The macula is the visual center of the eye, located where light rays focus on the postage-stamp-size retina at the back of the eyes. The retina is like film in a camera, composed of millions of light-receptor (photoreceptor) cells for day and night and color vision.

Dry-form macular degeneration strikes many more people and robs senior adults of their central vision, but side vision remains. Dry-form macular degeneration can develop into the fast-progressive wet-form of the disease. About 9% of America’s 40 million retirees have dry-form macular degeneration and about 225,000 (2008) of these are undergoing treatment for the wet form, which consists of needle injections of medicine directly into the eye.

In wet-form macular degeneration there is usually visual distortion, blind spots in one’s vision, and invasion of the visual center of the eye by abnormal blood vessels, the aforementioned process called angiogenesis or neovascularization.

When a person cuts their finger chemicals are released at the site of that wound that weaken surrounding blood vessels and new branches of blood vessels crop out from existing ones and make their way to the wound site, to facilitate clotting, infection control and healing. About three weeks after the initial wound, these abnormal

Ability of resveratrol to inhibit new blood vessel formation in the retina of animal eyes



blood vessels recede. Angiogenesis doesn't cease in wet macular degeneration. The visual center of the eye is invaded by abnormal blood vessels till vision is totally and permanently destroyed.

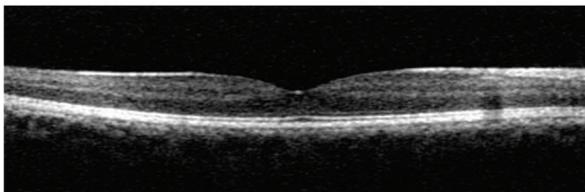
In the human retina, when circulation is impaired and there is a lack of delivered oxygen to tissues, two genes are activated. One is called hypoxia inducing factor-1 (HIF-1) and the other is vascular endothelial growth factor (VEGF). These genes when activated will create proteins that will trigger the undesirable and destructive outcropping of new blood vessels, as explained above.

But in the eye, new blood vessels can destroy the macula permanently. If a way can be found to restore blood circulation to the back of the eyes and cause these new blood vessels to recede, vision loss can be averted.

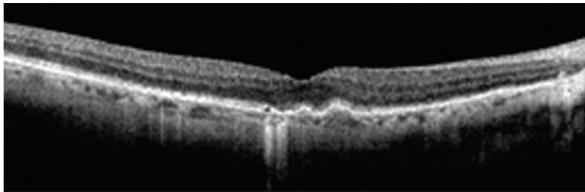
Resveratrol inhibits the two key genes, HIF-1 and VEGF so that new blood vessels recede and do not invade the visual center (macula). This has been graphically demonstrated below. Additionally, resveratrol appears to improve choroidal circulation to the retina, delivering more oxygenated blood and diminishing signals to create new blood vessels.

Photographic images of blood vessels in the retina are shown on left. The outcropping of new blood vessels (angiogenesis, neovascularization) can be seen in the blown-up image. The [resveratrol-treated blood vessels](#) are shown below. The bar chart on the right quantifies the ability of resveratrol to inhibit new blood vessel formation in the retina of animal eyes. It is quite remarkable.

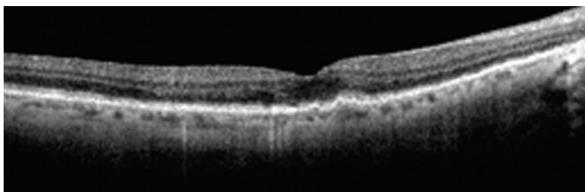
Normal healthy retina, for comparison



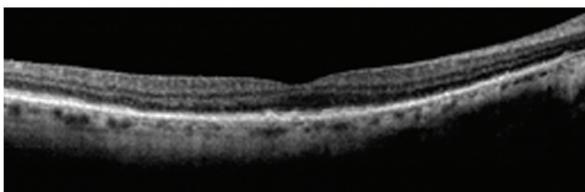
Diseased retina - wet macular degeneration
baseline



Longevinex®
10 week treatment



Longevinex®
20 week treatment



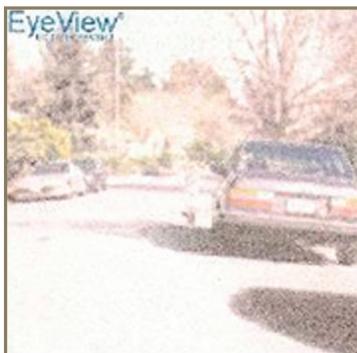
While the images on the left were obtained from animal eyes, the images on this page exhibit a side view or slice of the human retina. The top image is a normal healthy retina.

The following views show a diseases retina (wet macular degeneration) with resolution of abnormal blood vessels and restoration of normal retinal architecture within 20 weeks taking a resveratrol-based dietary supplement (*Longevinex*®). Restoration of functional vision was restored within days in this patient.

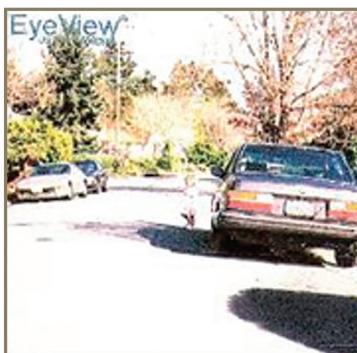
Visual improvement (contrast vision)
taking resveratrol (Longevinex®)



Original



Reduction in
contrast vision
caused by
macular
degeneration
(note disappearance
of small girl standing
in street next to car)
Date: 9/7/2007



**Vision
restored**

Date: 2/13/2008

Summary

What we have learned so far is that resveratrol is the most potent anti-cancer molecule in existence, that it prevents mortal heart attacks, at least in lab animals, and averts a devastating form of blindness, as already demonstrated in humans -- the three most feared health problems of humanity.

At this point, if you haven't ceased reading this report and rushed down to the vitamin shop to buy a bottle of res pills, well, there may be something loose in your head and maybe you need a resveratrol pill to fix that too! [Resveratrol does help promote clear thinking.](#)

Yet most people want to hear their health problem is fixed by resveratrol, or hear that their risk for a disease their parents experienced is reduced. For the unconvinced, here is a partial list of what else resveratrol can do.

- ✓ It has been demonstrated to cleanse the liver. About 35% of Americans have fatty liver disease and there is [no current drug that addresses this problem.](#)
- ✓ Resveratrol [inhibits the accumulation of beta amyloid plaque in the brain](#), believed to be involved in the development of Alzheimer's memory loss. It does this at very low concentration. Just a few micrograms works to eradicate brain plaque.

- ✓ Resveratrol inhibits inflammation by any measure. It lowers C-reactive protein (CRP), cyclooxygenase-2 (COX2), and tumor necrosis factor (TNF), all three measures of inflammation. Aging has been called “inflammaging,” since it is a hallmark in the aging brain, gut, liver, arteries, etc.
- ✓ Resveratrol cleanses the kidneys and improves kidney function.
- ✓ Resveratrol protects the sense of hearing.
- ✓ Resveratrol, at relatively low doses, mimics the genetic patterns produced by a calorie-restricted diet.
- ✓ Resveratrol works synergistically with prescription drugs, such as statins to lower cholesterol or anti-cancer drugs, helping prevent cancer drug resistance.
- ✓ Resveratrol helps blunt the effects of poor health habits, such as smoking and overconsumption of alcohol or food.
- ✓ Resveratrol mimics physical exercise in the animal laboratory.

Still most readers will persist in knowing if resveratrol is a remedy for a health problem they face, or a health problem that occurred to their parents and they fear will happen to them. In the interest of brevity, the answer is yes, resveratrol appears to address virtually all diseases known to man.

If it would put you at greater ease to know if resveratrol addresses your particular health concerns, then go to the National Library of Medicine website at www.ncbi.nlm.nih.gov/pubmed and type in your search query. Everything from epilepsy to memory loss is addressed by resveratrol.

Most consumers want to see the name of their disease on the bottle label of resveratrol pills. This will never happen as current regulations forbid such statements, that a dietary supplement prevents, treats or cures a disease. It will take decades for all this to be proven and you haven't the time to wait for more conclusive evidence.

next >

PART II: THE SECRET OF HOW RESVERATROL WORKS

PART II

THE SECRET OF HOW RESVERATROL WORKS

The secret of resveratrol's superlative biological action

So just why IS resveratrol so unique among other natural molecules? Why DOES resveratrol exhibit such profound biological action? Its secret may lie in its ability to control copper in the body.

Resveratrol solely binds to copper and not other metallic minerals. Resveratrol is “by far the most potent chelator (key-lay-tor) of copper.” Resveratrol also controls iron, but only indirectly by activating heme oxygenase, an iron-controlling molecule.

The ability to control copper with advancing age is important. Here are some reasons why

✓ **Copper, resveratrol and cancer**

Copper is a primary growth factor for tumor cells. It is well established that levels of copper in cancerous tissues are greatly increased. Resveratrol can bind to copper in cancer cells and use it to selectively destroy cancer cells.

✓ **Copper, resveratrol and cholesterol**

Copper is the primary oxidizing agent that hardens cholesterol in arteries. Resveratrol inhibits the hardening (oxidation) of the most dangerous form of cholesterol – LDL (low density lipoprotein). It does this by virtue of its ability to bind to copper.

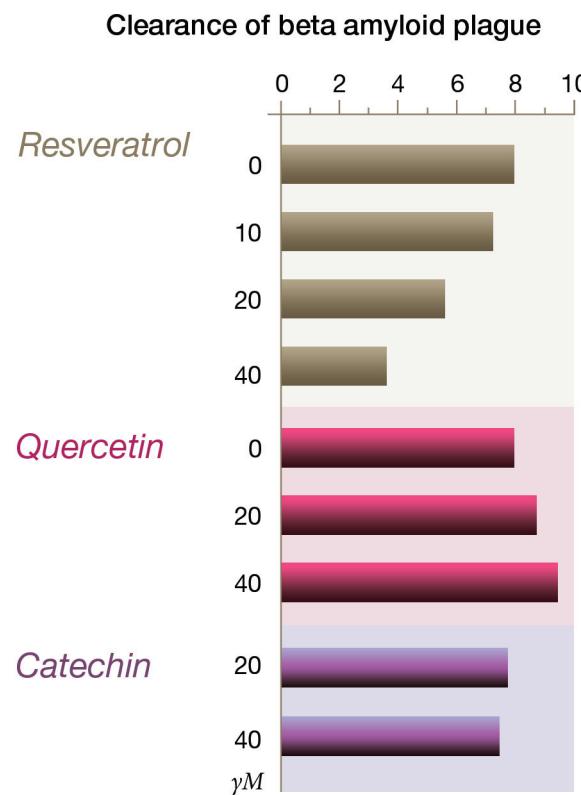
✓ **Copper, resveratrol and diabetes**

A state of copper overload has been linked to the onset of diabetes. An experimental copper-chelating drug employed in an animal experiment, has been demonstrated to reverse existing diabetes. The provision of resveratrol to laboratory rats prior to chemical induction of diabetes reduced red blood cell levels of copper and decreased features of the disease. This was accomplished using a relatively low dose of resveratrol (35 mg human equivalent dose).

✓ **Copper, resveratrol and age-related brain disorder**

Indeed, researchers now believe elevated levels of metals, particularly copper and iron, are responsible for the age-related triad of brain diseases (Alzheimer's, Parkinson's, Huntington's disease and other nerve disorders such as macular degeneration. In fact, researchers say "a logical therapeutic approach is to remove the toxic levels of these metals, copper and iron in particular by selective chelation (removal)."

Effect of resveratrol to clear beta amyloid plaque from the brains of animal eyes



Copper is the primary metallic mineral along with iron that is involved in age-related brain diseases such as Alzheimer's, Parkinson's and Huntington's diseases.

Resveratrol dissolves beta amyloid plaque in the brain.

The problem posed by beta amyloid plaque accumulation in the aging brain is not formation of this cholesterol-like plaque but rather inability to expel or clear it from brain tissues as it is produced. It is not the production of beta amyloid plaque in the brain that leads to Alzheimer's disease per se. To repeat, it is the inability of beta amyloid to be expelled from brain tissues.

Resveratrol enhances clearance of beta amyloid plaque from the brain.

Chart on the left shows resveratrol at increasing concentrations clears beta amyloid plaque from animal brains whereas other natural molecules have little or no effect.

In laboratory mice, a copper-chelating agent has been successfully used to reduce beta amyloid plaque in the brain. Copper-chelating drugs not only reduce beta amyloid plaque, but also were shown to improve the working memory of laboratory animals.

Copper in very low concentration, just 1/10th of Environmental Protection Agency limits in drinking water, is sufficient to induce accumulation of beta amyloid plaque in the brain of laboratory animals. [When copper is absent, beta amyloid is cleared from animal brains.](#)

There is a vicious cycle in the brain where excess copper is dealt with by beta amyloid plaque expelling this metallic mineral, but in so doing, it removes copper altogether. Some copper is needed to produce a critical antioxidant called superoxide dismutase. A [copper deficiency within brain cells then renders these nerve cells](#) vulnerable to destruction.

Just how the brain literally is destroyed from within as it ages is described by researchers in India. They report that it all begins with broken strands of DNA. These researchers studied three groups of humans below age 40 years (group 1), age 41-60 years (group 2) and age 61 years and above (group 3). [Levels of copper and iron rose with advancing age](#) in these tissues. The accumulation of these metals correlated with breaks in DNA.

✓ Copper, resveratrol and aging

There is a convergence of data from various fields of biology and medicine that point to the age-related accumulation of metals, particularly copper, as the controlling factor in the rate of aging.

For example, various short-lived organisms are used as models for human aging, which includes yeast cells, round worms and fruit flies. A recent study shows mutations in a particular gene called parkin results in premature aging among fruit flies (*Drosophila melanogaster*). Mineral chelators (key-lay-tors) that bind to copper stimulate production of an internally-produced antioxidant (superoxide dismutase-1) which reverses the shortened lifespan of parkin gene-deficient flies. The [parkin gene is linked to Parkinson's disease](#) in humans.

About three years ago it was demonstrated in the laboratory that modest amounts of cocoa powder, which has [copper-binding molecules in it, extends the life of fruit flies](#), whereas with higher doses there is no effect.

✓ **Copper, resveratrol and macular degeneration**

Macular degeneration, a prevalent form of legal blindness among older Americans, is [not common in India, where copper piping is not used](#). An experimental [copper-binding drug has been used](#) in the laboratory to inhibit the outcropping of new blood vessels (neovascularization) that can destroy the visual center (macula) of the eyes.

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PART III: QUESTIONS ABOUT RESVERATROL

PART III

Questions To Ask When Purchasing Resveratrol Pills

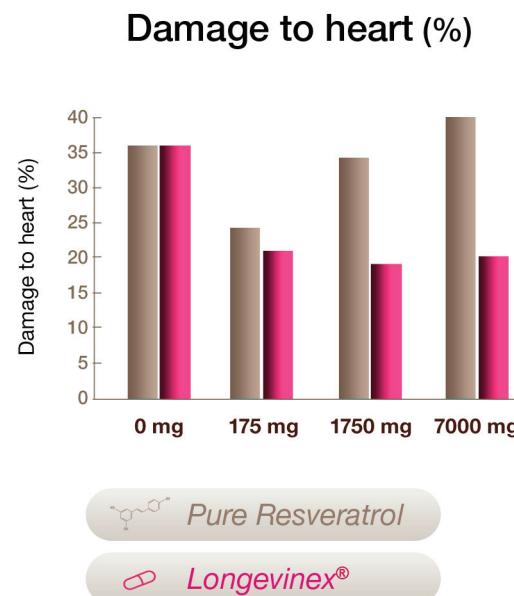
Remaining questions

Now that you are sold on the idea of supplementing your diet with resveratrol, questions remain about dosage, frequency, with meals or not, medications that may not be appropriate with resveratrol, and certain groups of people for whom this natural molecule is contraindicated. Another important question is whether the effects of resveratrol can be enhanced. Also, interested consumers may want to know how to read labels on resveratrol dietary supplements and whether products on store shelves actually provide sufficient amounts of resveratrol.

What is the proper dosage range for resveratrol?

One thing is certain, mega-dose resveratrol is not beneficial and may even be harmful. Resveratrol is an anti-oxidant at low doses and a pro-oxidant at high doses – this is it generated free radicals and harm tissues. The dosage range where this pro-oxidant action begins is not precisely known, but somewhere between 350 mg and 1750 mg (human equivalent dose) in animals produced this undesired effect.

Effect of resveratrol to clear beta amyloid plaque from the brains of animal eyes



One of the reasons posed for taking resveratrol pills is that they may mimic the health benefits provided by a limited-calorie diet. Relatively low-dose resveratrol has been shown to partially mimic the effects of a calorie-restricted diet.

Longevinex® brand resveratrol is the first to demonstrate that ultra-high doses of resveratrol can be consumed without cell destruction. In a published laboratory experiment, up the human equivalent of 7000 milligrams of Longevinex® powder, providing 2800 mg of trans resveratrol to laboratory animals, did not induce cell death (cytotoxicity). So far, Longevinex® is the only resveratrol pill to exhibit this effect.

Are there ways to enhance the biological action of resveratrol?

Downsizing resveratrol to micron size enhances absorption and improves blood levels. Strikingly, a recent study shows micronization improves blood levels of resveratrol by 360%. Longevinex®, a proprietary brand of resveratrol, is offered as a micronized, microencapsulated form of resveratrol.

Furthermore, biologists have found that combining resveratrol with other small molecules can synergize its biological effect. When Longevinex® combined resveratrol with quercetin and rice bran IP6 it activated 9-fold more genes (1711) than plain resveratrol (225) in laboratory mice.

Superiority Of Longevinex® Over Plain Resveratrol Induced Heart Attack In Excised Heart Of Rodents

Measure	Resveratrol		LONGEVINEX®	
	After heart attack, no treatment	After heart attack, with plain resveratrol	After heart attack, no treatment	After heart attack, with Longevinex®
Size (area) of heart attack (scar tissue)	35%	24% 32% reduction	35%	20% 43% reduction
Pumping pressure of the heart (mm Hg)	75	90 20% improvement	70	140 100% improvement
Blood flow in the aorta (first blood vessel outside the pumping side of the heart) in milliliters per minute	14	21 50% improvement	15	26 73% improvement
Percent die-off of heart muscle cells (apoptosis)	17%	12% 20% reduction	17%	9% 48% reduction

Copyright 2010 Resveratrol Partners LLC, dba LONGEVINEX®

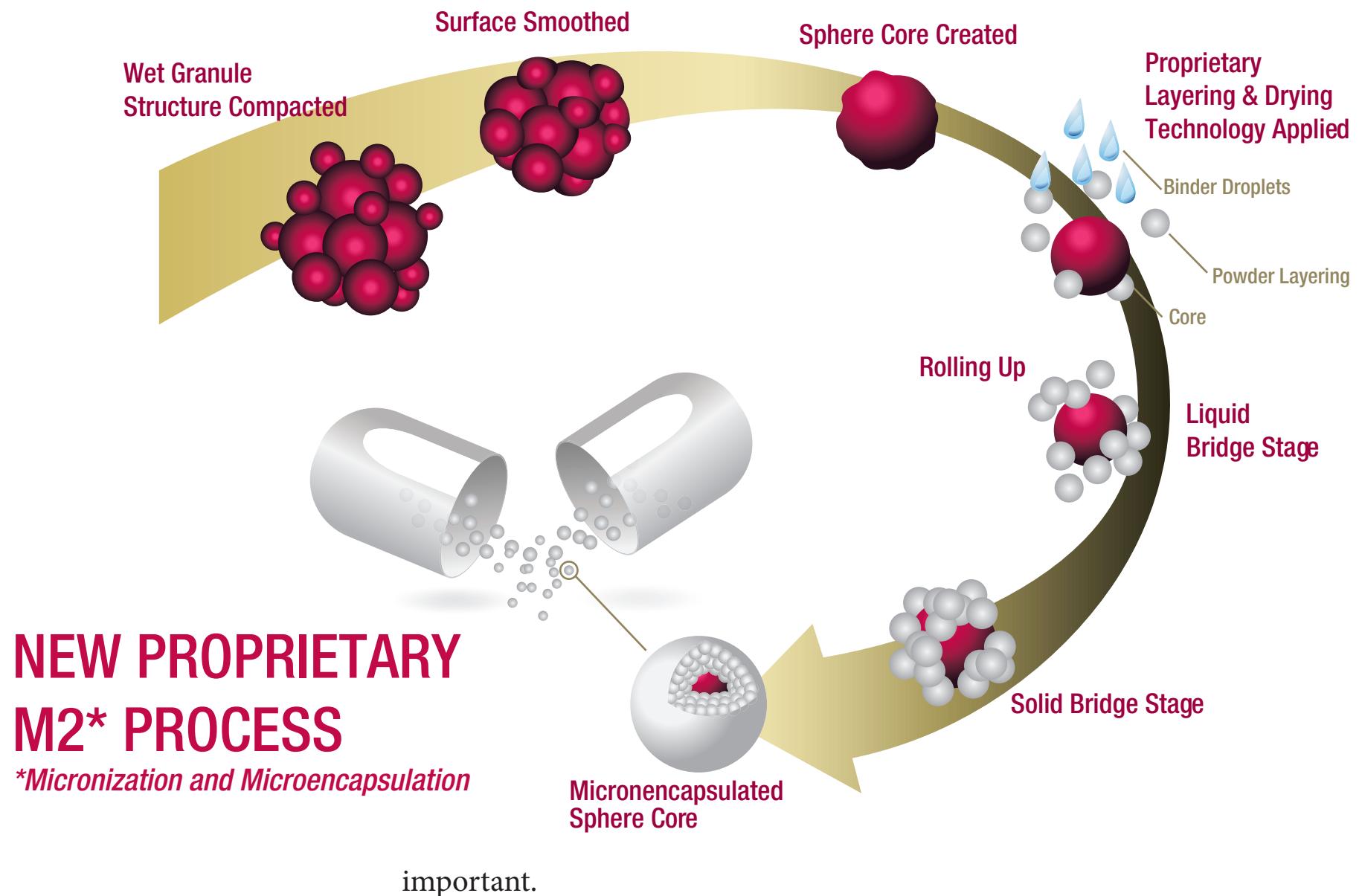
Furthermore, in an animal study following an experimentally-induced heart attack, Longevinex® more than doubled blood flow in the aorta, the first blood vessel outside the heart compared to plain resveratrol. This is evidence that combinations of molecules with resveratrol render it more powerful biologically.

What is microencapsulation and why is it beneficial?

Resveratrol is not a stable molecule when exposed to ultraviolet radiation. Unfiltered sunlight alters the active form of resveratrol (trans resveratrol) to the less active form (cis resveratrol). Microencapsulation enfolds trans resveratrol in plant dextrins and starches so it is never directly exposed to light, heat or oxygen. Longevinex® is currently the only brand of resveratrol supplement that is microencapsulated. The outer shell of its capsule is also opaque to further protect inner contents from exposure to light.

If the active molecule form of resveratrol (trans-resveratrol) is exposed to light it may convert to a less active form (cis-resveratrol) and reduce its copper-chelating effect.

Because resveratrol works in the animal lab doesn't mean it works as well in the human body. Laboratory researchers use research-grade resveratrol, which is sealed in an opaque glass vial and stored at below-freezing temperature. Careful attention to preserving resveratrol to deliver a product that is as close to research-grade is very



Are there any proven resveratrol supplements on the market?

Very few branded resveratrol pills have undergone animal or human study.

At the writing of this report there are just 9 published studies involving commercially available resveratrol supplements. Six of those studies used Longevinex®, which provides a matrix of other small molecules in addition to resveratrol. This resveratrol matrix has been shown to be superior to plain resveratrol in many ways, activating more genes, improving circulation after a heart attack, limiting damage in animal hearts following a heart attack, and reversing the development of unwanted new blood vessels at the back of the eyes. Despite this exciting science, most consumers consider these scientific studies to be advertising fluff and that the wool is pulled over consumers eyes by manufacturers to justify higher prices. The opposite is true. The least expensive resveratrol pills on the market often provide very little or no resveratrol at all.

How many resveratrol pills do you have to take per day to achieve optimal heart protection?

Comparison of Longevinex® to big-box store brands

Optimal dosage range for heart protection = 70-175 mg resveratrol* (*larger doses diminish the protective effect*)

Big-box store #1



“Resveratrol Red Wine Extract”

Retail Price: \$8.00

Quantity: 80 capsules

“Red Wine Complex 200 mg, Red Wine Extract
(Vitis vinifera) (grape skin)”

70 - 175 pills per day

- ✓ Resveratrol = probably no more than 1 mg/pill
- ✓ Published studies: None

Big-box store #2



“Grape Seed & Resveratrol”

Retail Price: \$19.99

Quantity: 300 softgels

“15 mg resveratrol”

5 - 12 pills per day

- ✓ Resveratrol = 15 mg/pill
- ✓ Published studies: None



“Longevinex®”

Retail Price: \$36.95

Quantity: 30 capsules

“100 mg trans resveratrol”

1 pill per day

- ✓ Resveratrol = 100 mg/pill
- ✓ Published studies: 10

*Source: Free Radical Biology & Medicine volume 44 (1): Pages 82-90, 2008

Cost conscious consumers run to retail stores and usually select resveratrol pills based upon affordability rather than any proven performance. Not all resveratrol pills are equal. When Longevinex® initially reported most brands of resveratrol pills did not provide the labeled amount of resveratrol, it was sued by competing companies who sought to cover up the fact their products provided very little of the active labeled amount of resveratrol.

Some products sold at big-box discount stores have RESVERATROL emblazoned on the front label, but careful examination of the supplement facts box reveals there is no assured amount of resveratrol provided in the product beyond a trivial amount (micrograms) found in grape skin or other natural sources. These products provide 1000-times less resveratrol than found in a six-ounce glass of red wine.

Research Studies Conducted With Resveratrol Dietary Supplements

LONGEVINEX®	All 290 Other Brands
<p>✓ 2008: Longevinex® reduces inflammation and oxidation better than green tea. Appalachian State University</p>	<p>✓ 2010: Pure Encapsulations 40 mg resveratrol reduced markers of inflammation and oxidation in humans. Journal Clinical Endocrinology Metabolism</p>
<p>✓ 2008: Longevinex® activates 9-fold more genes than plain resveratrol in short-term study; would require life-long calorie-restricted diet or intake of plain resveratrol to produce same effect; switches 677 of 832 longevity genes in same direction as calorie restricted diet. Experimental Gerontology 2008</p>	<p>✓ 2010: Transmax (Biotivia) failed to improve cognition (thinking) in human adult subjects. American Journal Clinical Nutrition</p>
<p>✓ 2009: Longevinex® activates sluggish white blood cells and inhibits sticky blood platelets in 30 minutes. Nutriscreen, Covina, California</p>	<p>✓ 2010: Transmax (Biotivia) 4000 mg induced diarrhea in 6 of 8 subjects; indication of emodin content. Clinical Pharmacokinetics</p>
<p>✓ 2010: Longevinex® turns mortal heart attacks in lab rats into non-mortal heart attacks. Potentially works more reliably than aspirin. Canadian Journal Physiology & Pharmacology</p>	
<p>✓ 2010: Longevinex® reduces cholesterol, improves circulation in rabbits. Molecular & Cellular Biochemistry</p>	
<p>✓ 2010: Longevinex® abolishes first sign of atherosclerosis (flow-mediated dilatation) in human trial; lowers insulin levels. Kansai Medical University, Osaka, Japan - to be presented at Japanese Circulation Society 2011</p>	

2010: **Longevinex®** exerts far more action over genome (library of human genes) and improves circulation in excised rat heart following heart attack than plain resveratrol; first microRNA study of resveratrol dietary supplement. [*PLoS ONE Dec. 2011*](#)

2011: **Longevinex®** exhibits first L-shaped risk curve ever recorded in biology. Exhibits no cytotoxicity (cell killing) up to 7000 mg human equivalent dose in lab animals up to 90-days. [*Experimental Clinical Cardiology Winter 2010*](#)

Can I just drink red wine and obtain the same effects?

There are certain health benefits attributed to red wine. Aside from the fact it would take 3-5 glasses of red wine to produce similar health benefits compared to a resveratrol pill (which would cost roughly \$3-5 a day for modestly priced wine), and that amount of wine induces inebriation, it has been demonstrated that wine will reduce the size of a heart attack. The amount of damaged tissue following a heart attack was recently measured after consumption of wine and plain resveratrol. Here are the results of that study:

Resveratrol Works Better Than Wine To Minimize Damage Following A Heart Attack

	Post Heart Attack- no treatment	Alcohol only	White wine	Red wine	Resveratrol
Size of heart attack area of scarred tissue	37	31	24	23	20

Source: Mukherjee S, Lekli I, Gurusamy N, Bertelli AA, Das DK, Expression of the longevity proteins by both red and white wines and their cardioprotective components, resveratrol, tyrosol, and hydroxytyrosol. *Free Radical Biology & Medicine* 46 (2009) 573–578

next >

PART IV: DO RESVERATROL PILLS HAVE A FUTURE?

Part IV

Do Resveratrol Pills Have A Future?

For a variety of reasons, the future of resveratrol pills is tenuous.

With resveratrol pills, humanity has a great opportunity here to stave off the ravages of aging, reduce out-of-pocket health care expenses, to avoid tremendous human suffering and side step over-dependency upon loved ones and spending the last years of life in a nursing home. But who would alert the masses of this possibility?

Americans appear to be waiting for public health officials to pay for such a pill. A few years back the Rand Corporation, a think-tank for government, actually penciled in an anti-aging pill into future Medicare budgets. But the health care industry is not expected to embrace resveratrol pills.

Few Americans recognize population control efforts are underway. Cures for cancer will always be off in the future. As the editors of Time Magazine said in the 1970s, when there was talk of an anti-aging pill, "*we have birth control, but not age control,*" which suggests covert population control efforts are underway.

And even fewer Americans realize that certain levels of disease are being dialed in to the population-at-large by setting essential nutrient requirements that do not promote optimal health.

For example, iron fortification of foods may be desirable for growing children and menstruating females, but excessive iron is a primary cause of liver disease, diabetes and impaired immunity. While iron fortification began in the U.S. in 1940 and did reduce the incidence of iron-deficiency anemia, this practice only represented disease substitution, not disease prevention. It took about three decades for the iron overload problem to become apparent. Now America faces a diabesity epidemic. Excessive iron is implicated in diabetes. Sweden abandoned iron fortification of foods in 1995, noting a 3.5 times increase in liver cancer among Swedish women.

Another example is vitamin D. There is certain foot dragging by the Institute of Health over scientific revelations that greater amounts of vitamin D would likely reduce overall mortality rates as well as save trillions of health care dollars over coming decades. The Institute of Medicine Food & Nutrition Board set vitamin D blood levels at commonly-achieved levels, not at levels for optimal health. The minimum intake level for vitamin D would not prevent rickets in African American infants and the recommended daily intake level would not measurably raise blood levels. The public remains oblivious to this disease mongering.

To get back to resveratrol, had the public staged a run on resveratrol pills by now, it would be politically more difficult to deal with any foot dragging over their availability. But now it appears, via a conjured up threat that dietary supplements are unsafe, when in fact they are safer than aspirin, tap water and table salt, the Food & Drug Administration wants costly safety tests to be performed on all resveratrol pills. Many

resveratrol supplements will likely disappear from store shelves as the cost of safety testing far exceeds profits generated by sales.

Conclusive evidence that resveratrol pills work in humans is years away and it's not likely the medical profession is going to embrace resveratrol as it points medicine in a different direction altogether. Resveratrol spells l-e-s-s d-i-s-e-a-s-e and l-e-s-s d-o-c-t-o-r-i-n-g. Good for patients but not for doctors or pharmaceutical companies.

You have read, in part I and II, of the compelling evidence for resveratrol and its health benefits. There will never be enough science. Consumers will always be forced to gauge the future promise of health posed by taking resveratrol pills.

Even the most compelling science doesn't equate with increased consumer demand.

Only an estimated 125,000 American adults out of a target population of 200+ million take resveratrol pills, about 6 out of 10,000 Americans or less than 1/10th of one-percent of American men over age 25 and women over age 45.

Each time the clock ticks we progressively age, though at a much faster rate after age 40, and some researchers believe resveratrol pills may actually push the biological clock hands of time backwards. But that fact hasn't sunk in yet, maybe because consumers want to look younger in the mirror rather than get old at a slower speed.

Such a pill may still not be what Americans really want, which is to erase the visible

signs of aging, to have thick dark hair, smooth skin and Viagra! If only these pills would magically make one look like they were 20 again, they would be the rage, wouldn't they?!

Another important fact is that resveratrol may not address an existing health problem but rather an imagined health problem in the future. Evidence presented suggests resveratrol could largely erase cancer, sudden mortal heart attacks and the most severe form of blindness from aging human populations. But consumers are not likely to take resveratrol pills till they are diagnosed with a disease by their doctor and insurance plans pay for the pills.

Many consumers have tried resveratrol pills and concluded they didn't feel anything. It was historian Thomas Fuller (1608-1661) who once said: "Illness is felt, but health not at all." With cholesterol pills consumers have a number to chart their effectiveness. With cancer drugs there are tumor markers. But with resveratrol pills, the absence of disease has no measure.

Furthermore, most of the resveratrol pills on the market are poorly formulated and offer paltry low doses or overdoses, and have little chance of working. Resveratrol pills are a grab bag in vitamin shops as to which brand works and which one doesn't.

There are many other reasons why Americans haven't adopted resveratrol pills.

No resveratrol drug

There is no pharmaceutical version of resveratrol that is advancing through human clinical trials.

The abandonment of Sirtris Pharmaceuticals SRT501 resveratrol “*drug*” by a major pharmaceutical company suggests the industry was forced to buy out the only resveratrol venture and get it off the market. After all, resveratrol poses a great threat to modern pharmacology. The public, however, perceived this as a failure of resveratrol to perform because the abandonment was preceded by a failed trial of mega-dose (5000 mg) resveratrol which resulted in kidney failure among bone marrow cancer (multiple myeloma) patients. The fact that mega-dose resveratrol pools in the kidneys prior to excretion and reaches very high concentration, where it can turn from an antioxidant into a pro-oxidant (generate tissue-destructive free radicals), should have been anticipated. It is well known that resveratrol turns from being a protective antioxidant at low dose to a pro-oxidant at mega doses.

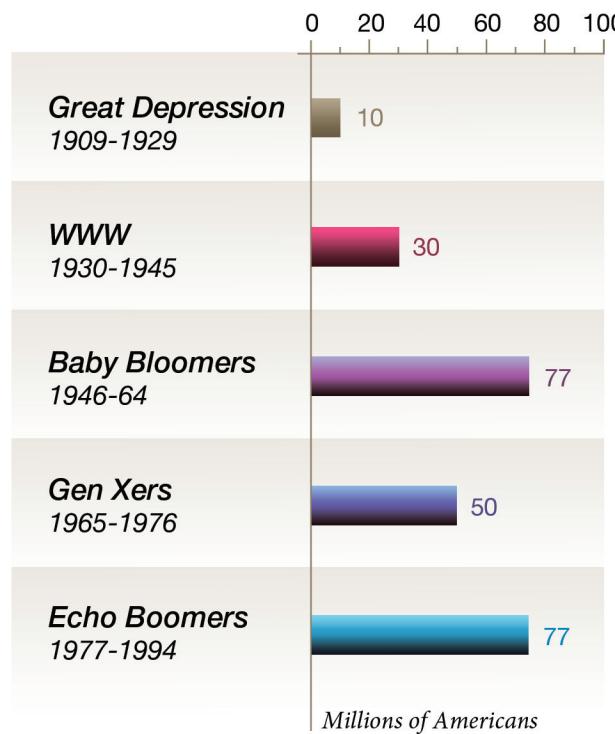
Top-Ten Brand Name Prescription Drugs – Medicare Part D

Prescription Drug Name	Drug Cost	Drug Fills	Drug Users	Cost per year
LIPITOR (cholesterol)	\$2,397,843,000.00	18446000	3124884	\$767.00
PLAVIX (blood thinner)	\$2,305,145,585.00	14268556	2156161	\$1,069.00
NEXIUM (antacid)	\$1,487,052,730.00	7910276	1480154	\$1,004.00
SEROQUEL (depression)	\$1,462,338,499.00	6041165	767,250	\$1,905.00
ARICEPT (dementia)	\$1,326,144,339.00	7102825	1041484	\$1,273.00
ZYPREXA (mental problems)	\$1,229,061,198.00	2814611	339,616	\$3,618.00
ADVAIR DISKUS (asthma)	\$1,213,298,009.00	5507752	1278663	\$948.00
ACTOS (anti-diabetic)	\$1,062,975,107.00	5174608	846,082	\$1,256.00
PREVACID (antacid)	\$848,394,558.00	4498340	829,433	\$1,022.00
ABILIFY (depression, mental issues)	\$837,090,968.00	1841769	279,433	\$2,995.00
RESVERATROL (generic) estimated	\$30,000,000		125,000	\$325.00

Source: <http://www.cms.gov/dashboard/downloads/partDdash.asp?agree=yes&next=Accept>

Top Ten Drug Classes			
Drug Class	Drug Cost (\$)	Drug Fills	Drug Users
Anti-cholesterol pills	6347995195	89295121	13,094,693
Anti-psychotics	5904046648	23811623	2513105
Anti-ulcer drugs	5502866195	64794753	5985119
Blood pressure pills	4640583956	52881591	8571421
Anti-asthmatic pills	4398796572	101439105	13,567,292
Psycho-therapeutic	4293140905	32298611	1877164
Anti blood clotting agents	3010966764	18407936	2755955
Antidepressants	2974334246	60220419	7528240
Analgesics- pain relievers	2868379387	62054861	10,352,486
ALL OTHER	29,907,749,329	549,519,258	25,526,821
Total	73,641,513,693	1070089652	26,517,236

2010 Population by age group



Baby Boomers are the target audience

The Baby Boomers, who are the target market for resveratrol pills, and who so many products were created for, ranging from baby formula to sleek automobiles and now motor homes, are now entering their retirement years and are most in need of staving off the ravages of aging.

But the Baby Boomers have crossed wires over anti-aging pills since so many take problematic prescription drugs without even thinking twice about their downside, and because their health plan pays for them. Yet they are quite circumspect about anti-aging pills, which are still unproven, right? Whereas prescription drugs are FDA approved! Right? Many longevitarians might take a resveratrol pill, but only if it doesn't interfere with any of their drugs.

Online confusion and fraud over resveratrol

Another reason why a resveratrol-led health revolution is not underway is because consumers today are largely gaining information about this molecule from the internet. Unfortunately the internet is riddled with hucksters who are the most visible and who make bogus claims that their resveratrol pills erase wrinkles, melt pounds of weight away, prevents Alzheimer's disease and cures cancer. And frankly, there is some evidence that resveratrol pills may deliver on those promises and more, but probably not with the weak and untested pills that are being sold by spammers online.

For unexplained reasons, the only successful marketers of res pills so far have been the online spammers. Consumers fell en masse for bogus free-bottle offers that were used to covertly induce them into monthly billings for resveratrol pills they never ordered. One slick online marketer in Canada sold over \$100 million of res pills in North America while all the retail stores and other online sources sold only \$30 million of these so-called red wine pills in a year. For comparison, since 2001 sales of vitamin D supplements have grown ten-fold, from \$40 million to \$425 million. Note that the re-discovery of vitamin D is any less a miracle than resveratrol, but sales of res pills are waning while sun-pills are booming.

There are other unstated reservations about resveratrol pills. When presented as an anti-aging pill, some fear the pill might actually work, that they would live too long and suffer through more years of senility, while others believe they would run out of retirement money. Still others fear contributing to overpopulation. When focus groups are shown a photograph of a man taking a resveratrol pill on his 100th birthday their first response is they would never want to live that long. It's best to avoid selling res pills for longevity and to show how they resolve a current or feared problem.

Peering into America's future with resveratrol pills

America is headed towards a known catastrophe. Modern medicine has cooked up ways for Americans to live longer, but not necessarily better. The threat of senility looms in the future as most Americans are now living into their eighth decade. The problem is, there is no known cure. The prospect of caring for millions of zombie Americans with memory loss is frightening.

All that modern medicine has to offer are ineffective pills (Tacrine, Aricept) that attempt to increase a key brain chemical (acetylcholine), an approach which has not proven to be effective. Furthermore, America's ailing healthcare system simply cannot afford expensive cures for Alzheimer's disease.

The best remedy would be prevention. If aging Baby Boomers don't grasp for something today, millions will be hopelessly mired in mental confusion, at great cost to families and society.

Resveratrol pills loom as a potential remedy for senile dementia.

Researchers have conclusively shown that anti-inflammatory agents (etanercept – ENBREL TNF-inhibitor) injected directly into the brain via neck veins rapidly resolves memory loss and dementia, but the effect only lasts a few days and the treatment is expensive (\$10,000 to \$40,000 a year). This proves that inflammation and not beta amyloid plaque, which is considered the main problem, is the chief cause of

the age-related dementia. This also demonstrates senile dementia can be remedied rapidly.

Now resveratrol is a known TNF inhibitor. It can be combined with other natural TNF inhibitors (vitamin D, quercetin, rice bran IP6) as provided in Longevinex® and would be worthy of use on a compassionate basis given there is no other proven remedy at hand. Resveratrol both facilitates the removal of beta amyloid brain plaque and inhibits brain inflammation.

Yes, doctors will continue to say resveratrol is unproven at this point in time. But existing FDA-approved drugs have already been disproven. The best available evidence suggests resveratrol pills are worth a try.

Final comment

Sadly, the long sought after “*fountain of youth*” would never materialize in a modern world that clings to the status quo. While Baby Boomers grimace at the prospect of age-related diseases such as vision loss, dementia and circulatory problems that accompany old age, the reigning healthcare delivery and pharmaceutical design system does not embrace a paradigm-breaking technology from nature that would eliminate the one-medication-for-one-disease model now in existence. There are forces in society that want to bury resveratrol pills.

Without significant public demand, resveratrol pills are subject to regulatory extinction. All suppliers of resveratrol pills face costly and time-consuming safety testing proposed by the FDA New Dietary Ingredient guidelines. There simply aren't enough Americans taking resveratrol pills to fight for their continued availability.

The fact there are so many untested and poorly designed resveratrol pills only perpetuates the false notion that these pills are ineffective and unworthy of further research. Even more dismaying is that elderly consumers are not of a mind to give up their problematic prescription drugs and even if they are, the few who chose to use resveratrol pills are largely using ineffective or problematic pills.

According to the Natural Medicines Comprehensive Database, there are now 360 brands of resveratrol pills being sold online or in retail stores. A rough estimate is that more than 99% of these products are untested even in a lab dish let alone animal or human experiments, and better than 75% either provide potentially troublesome mega-doses or only use the word resveratrol on the label as "*window dressing*" and provide minuscule doses of resveratrol that are not even equivalent to one glass of red wine. Only a couple of brands of resveratrol pills are specially preserved against exposure to light, heat and oxygen to ensure they provide the un-degraded form of trans resveratrol and are micronized to enhance absorption. Most resveratrol nutriceuticals on the market today make product claims based upon borrowed science under the false assumption their product is equivalent with research-grade resveratrol.

The resveratrol revolution is only pretend. The purchase price point for most senior Americans is less than ten-dollars. It is sad that the vast majority of Baby Boomers are brain-washed laggards who don't have the gumption to stand up to their self-interested doctors and take resveratrol pills, who are fearful of not taking their problematic drugs, and even if convinced of the promise of resveratrol, trade the promise of a healthy future for saving a few bucks by buying a cheap pretend resveratrol pill at Wal-Mart. Such are the flaws of modern man.

4 stages of life

