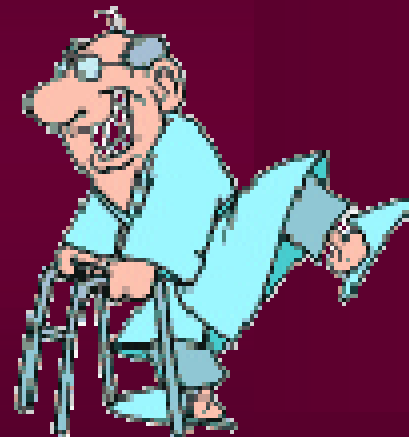


# Blueberries and Aging:

**Igor Zhukov**



# Brain

- Our brain works throughout life, requiring much blood to do so.
- Oxygen, delivered to brain with blood damages the neurons in a time-dependent manner via free radicals (highly active oxygen)
- Oxygen damage is thought to lead to age-related diseases(Parkinson's & Alzheimer's)



## Blueberries: *Vaccinium* sp.



- Contain multiple antioxidants in vast quantities.
- Prevent cancer
- Better than supplemented antioxidants
  - More than one antioxidant is present in Blueberries
  - Efficacy of a single antioxidant administration is questionable

# History:

- St Hildegard of Bingen, the first woman to write a Herbal, wrote that Blueberry fruits were good for inducing *menstruation* (12<sup>th</sup> century)
- Hieronymus Bock wrote that blueberries were useful for the treatment of **bladder stones, and lung and liver disorders** (16<sup>th</sup> century) (Germany)

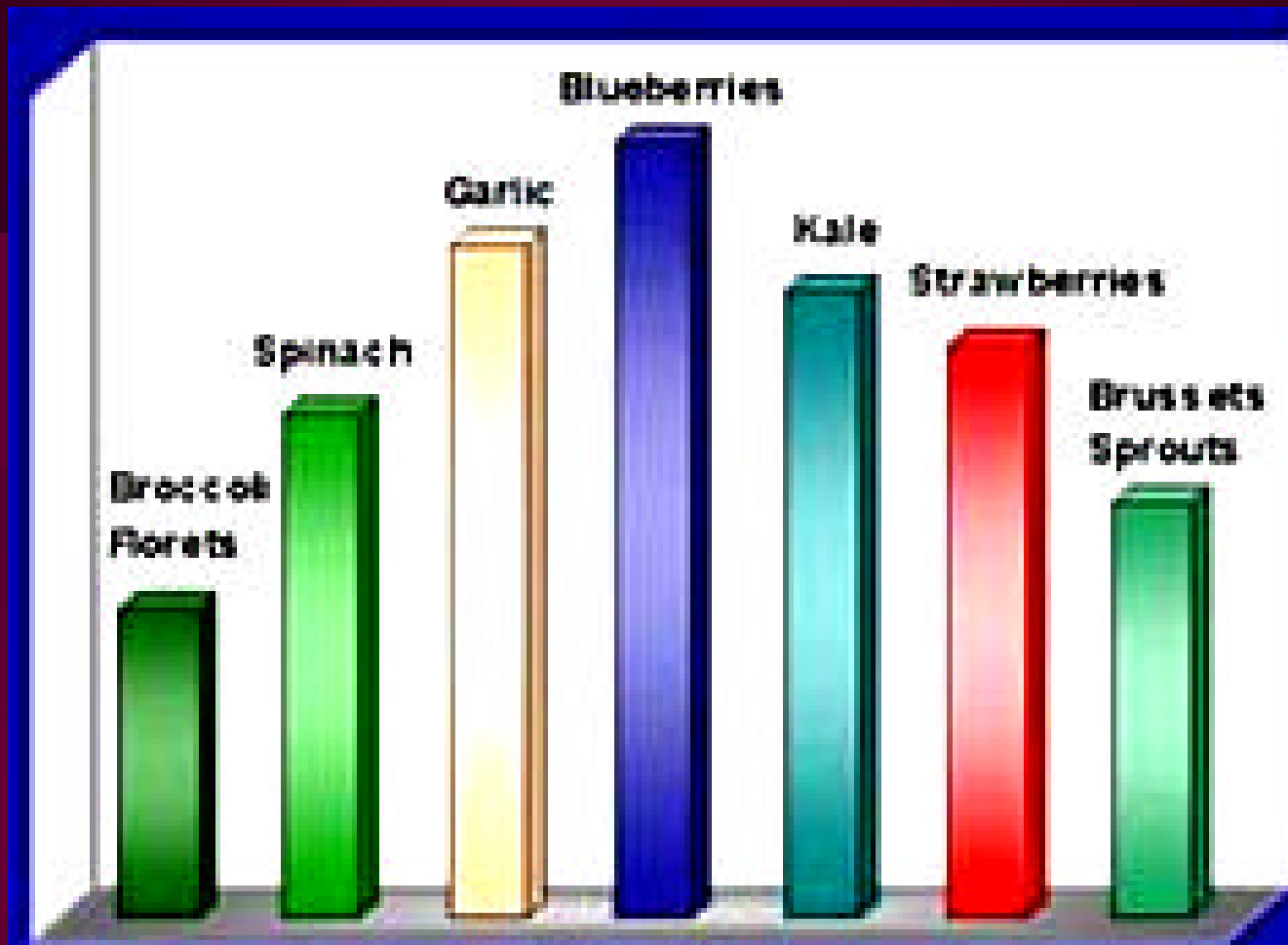
# History:

- 18<sup>th</sup> century, Germany: Blueberry used as an astringent for treating *diarrhoea*, as a diuretic, to prevent *scurvy* and as a mouthwash to soothe *mouth ulcers* as well as in the treatment of *gout and rheumatism*, and even to relieve the symptoms of *typhoid fever*.
- During WW2 when British Royal Air Force pilots were on nighttime bombing missions they reported that their **sight** was improved after eating blueberry jam

# History:

- Italian researchers, working between 1982 and 1987, reported that 76% of patients in their trials experienced a marked improvement in their *myopia (short-sightedness)* after being given 150mg per day of a blueberry extract, plus vitamin A, for 15 days.
- In North America the native American tribes have used various species of *Vaccinium* for medicinal purposes, using every part of the plant; flowers, fruit, leaves, young shoots, bark and even occasionally roots

# Blueberry vs. ???



**Blueberries ranked #1 for antioxidant activity by USDA studies among other commercial fruits and vegetables**

# Benefits:

- Old rats fed with equivalent of 1/2 cup of blueberries for 2 months as a supplement performed better than regular rats:
- Rod walking test:
  - Young - 14sec avg.
  - Old – 6 sec avg.
  - Blueberry – 10 sec avg.

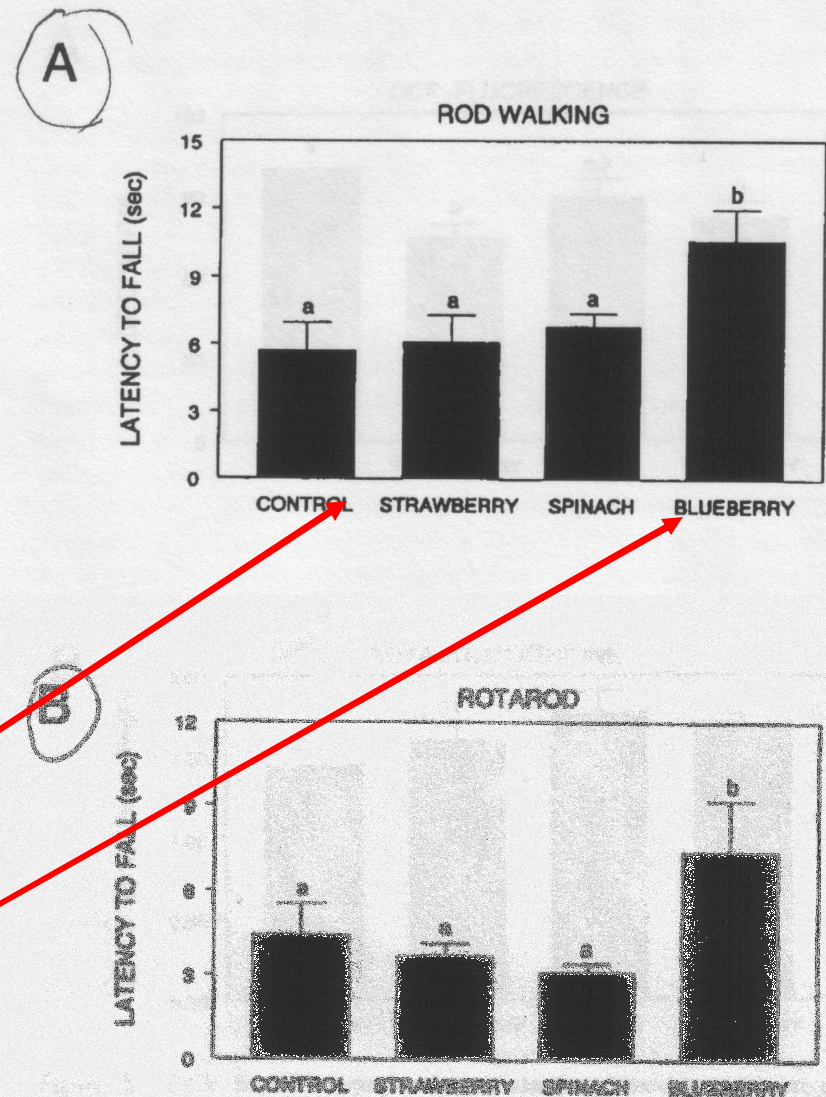


Figure 3. Performance (latency to fall, in seconds) on the rod walk (A) and rotarod (B) tests for the various diet groups. Means not sharing a common letter are significantly different from each other ( $p < 0.05$ ; Fisher's LSD).



## Benefits:

- Aging of the old rats was reversed by blueberry intake, increasing their motor performance and learning ability
- Blueberry is low in sugar – safe for diabetics
- Billberry – European relative of blueberry is as useful as is blueberry and often more available as various extracts.

# Benefits:

- **CANCER PREVENTION** Studies conducted by Mary Ann Lila Smith, Ph.D., Department of Natural Resources and Environmental Sciences, University of Illinois, Urbana-Champaign, indicate that compounds in Wild Blueberries may be effective inhibitors of both the initiation and promotion stages of cancer.

*Journal of Food Science, vol. 65, NO. 2, 2000.*

# Benefits:

- **URINARY TRACT HEALTH** At the Rutgers University Blueberry Cranberry Research Center, Amy Howell, Ph.D., showed that blueberries, like cranberries, contain compounds that prevent the bacteria responsible for urinary tract infections from attaching to the bladder wall.

*New England Journal of Medicine, October 8, 1998 Volume 339. Number 15.*

## How to...

- Eat fresh – better than pop-corn snack!!!
- Eat frozen “*The antioxidant capacity of blueberries was found not to diminish in storage. In fact, there was a slight increase in the anthocyanin level...*” Journal of Agricultural and Food Chemistry. 1999, 47, 4638-4644.
- Pies, jams, muffins etc. – you can’t go wrong, it’s not a “yucky” medicine!!!



BIG

SMILE 😊 !!!

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# Aging and Garlic

By Yuriy Zhukov



# Introduction: History

- Garlic (*Allium sativum* ) has been used for medicinal purposes as early as 3000 B.C. by Egyptians, Greeks, Indians, Romans, Babylonians, Vikings and Chinese.
- An Egyptian medical papyrus dated 1500 B.C. gives many therapeutic formulas, 22 of which mention garlic as a remedy for various ailments.

# Introduction: Present

- Modern technologies allowed study of garlic components and effects:
  - Antitumor
  - Antibacterial
  - Antifungal
  - Antiviral
  - Insecticidal

# Garlic Extracts

- Chronic administration of raw garlic causes toxic effects:
  - Anemia
  - Weight loss
- Aged Garlic Extract (AGE or GEX) lacks toxic properties while retaining beneficial activity
  - AGE is prepared by extracting sliced raw garlic with ethanol at room temperature for several months
- Garlic is also available in dried (pill) form
  - Easy to administer

# Garlic Research

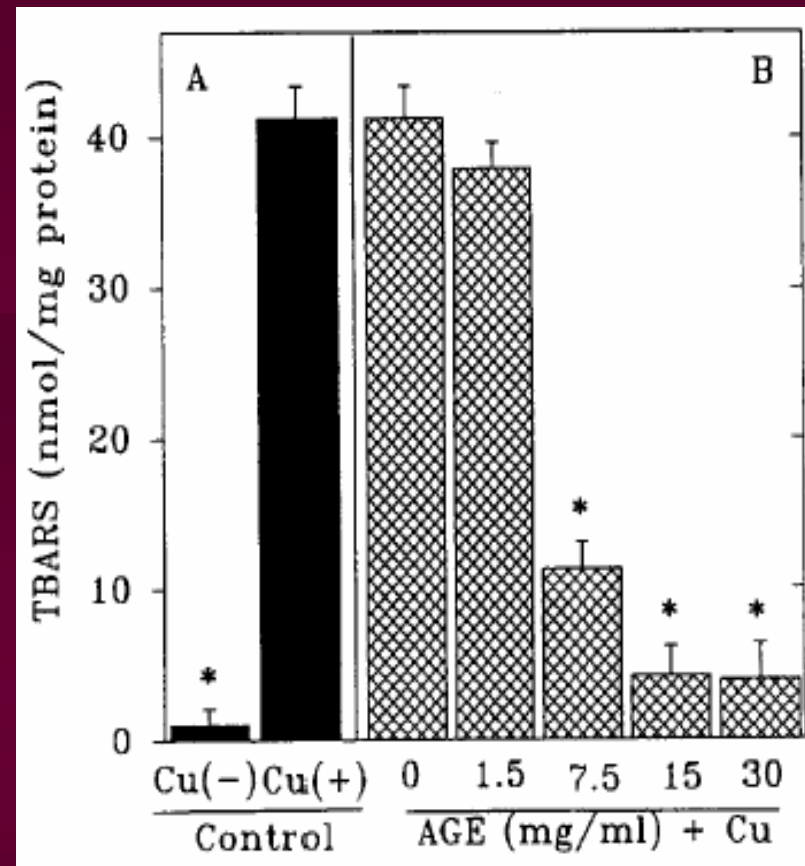
- Effects of AGE have been studied in a variety of the model systems:
  - Chemical
  - Cell cultures
  - Experimental animals: Senescence-Accelerated Mice (SAM)
  - Human Studies

# Cu<sup>2+</sup> - Induced Oxidative Damage of LDL

- Oxygen radical injury and lipid peroxidation
  - Cancer, Liver Disease, Aging Changes.
- Damage to LDL
  - Atherosclerosis
- Effects of AGE on Cu<sup>2+</sup> mediated LDL damage?

# Cu<sup>2+</sup> - Induced Oxidative Damage of LDL

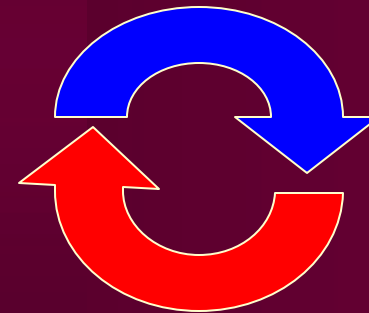
- Chemical experiment involving Cu, LDL and AGE
- Amount of damage was measured →
- Conclusion:
  - AGE is a good antioxidant!
  - May prevent atherosclerosis



# Human Growth Hormone Study

- The amount of HGH declines 15-30% per decade after age 30, and is non-existent by 80
  - Decline in HGH causes many symptoms of aging
    - Thin and dry skin
    - Body size ratio changes
    - Poor venous access
    - Reduced muscle strength
    - Depressed mood
  - Obesity and HGH levels

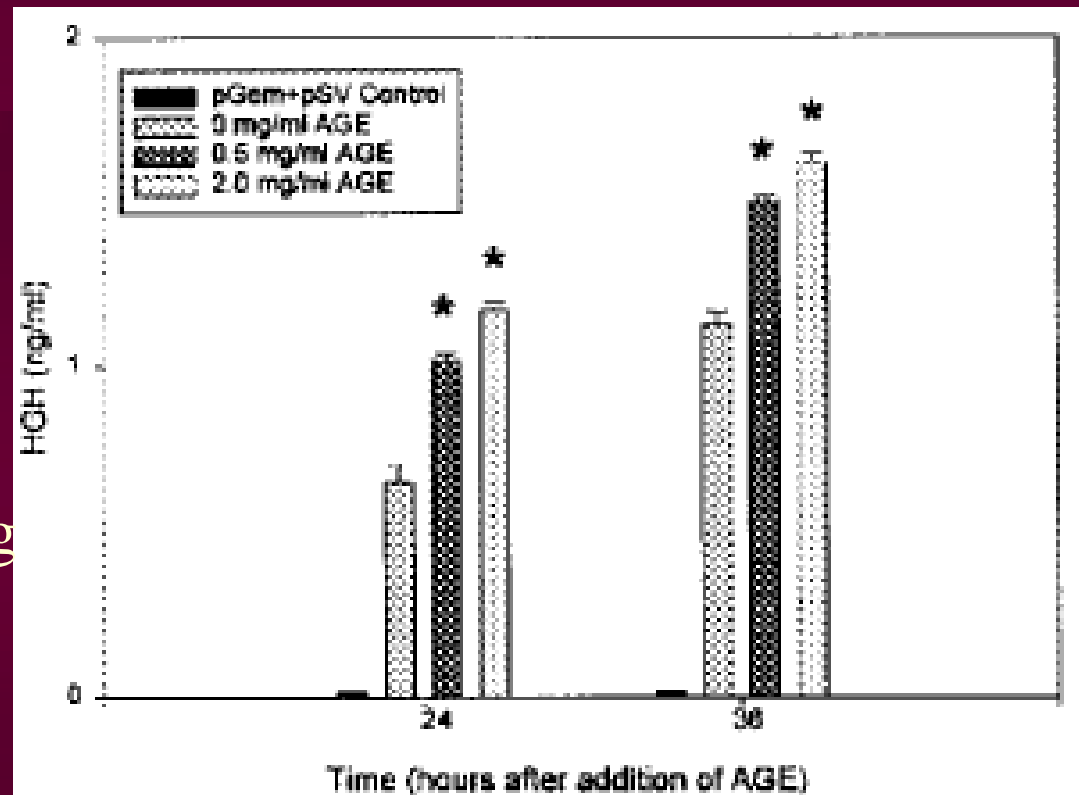
Decreased HGH



Weight Gain

# Human Growth Hormone Study

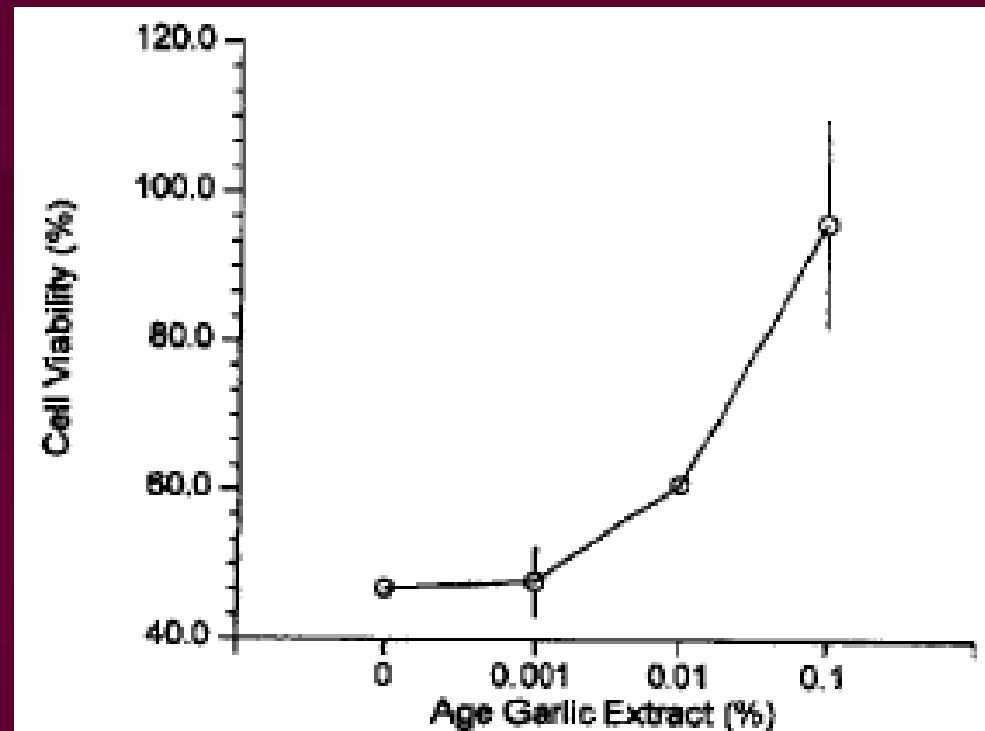
- Cells capable of HGH secretion were treated with AGE
- Results: →
- Conclusion:  
AGE may increase HGH secretion which in turn may alleviate many aging symptoms





# AGE and Alzheimer's Disease

- $\beta$ -amyloid peptide is a hallmark in AD, and is associated with significant toxicity
  - Plays an important role in the pathogenesis
- Experimental cell lines were grown with  $\beta$ -amyloid and AGE
- Results  $\rightarrow$

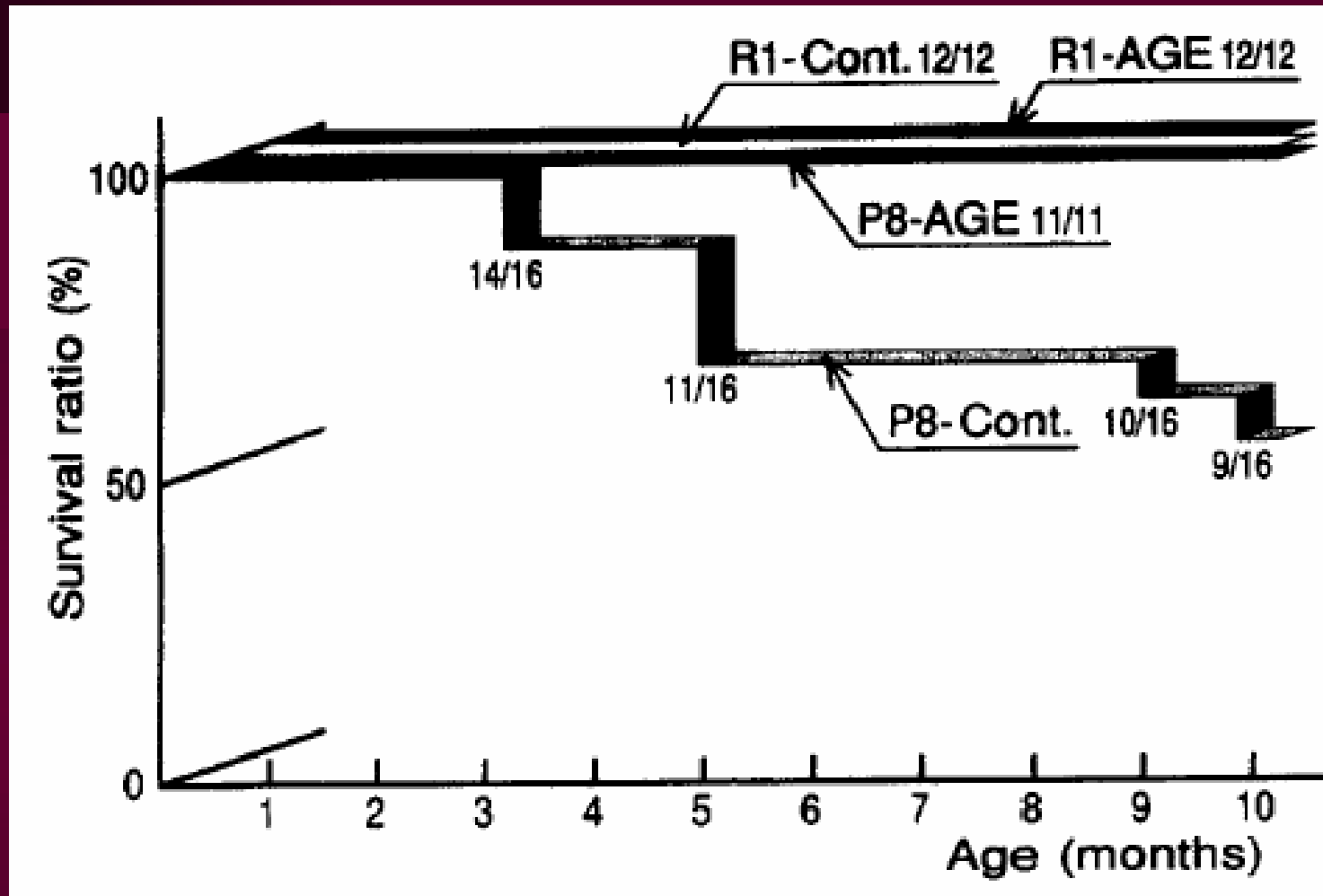


# Effect of AGE on Senescence

## Accelerated Mice

- SAM mice:
  - Early senescence
  - Short lifespan
  - Early memory deterioration
  - Brain atrophy
- Effects of AGE were determined by including it in the diet and conducting various tests

# Effect of AGE on Senescence Accelerated Mice



# Effect of AGE on Senescence

## Accelerated Mice

- Administration of AGE significantly increased longevity, memory and improved problem-solving skills
- AGE significantly decreased aging-related changes and brain atrophy

# Human Studies

- Although are long and difficult to conduct, provide beneficial information
- A study of two similar groups, one with regular intake of garlic powder ( $\geq 2$ ) years:
- Results suggest that there is a positive effect on aorta and other parts of cardiovascular system
  - Due to anticoagulant properties of garlic, patients with bleeding disorders should consult a physician

# Conclusion

- Garlic was used in medicinal purposes for a long time
- Recent research allows to discover more beneficial properties of garlic
- When administered correctly, minimal side effects and possible great benefits
- Why not?

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