VALENS®

VALENS CITICOLINE

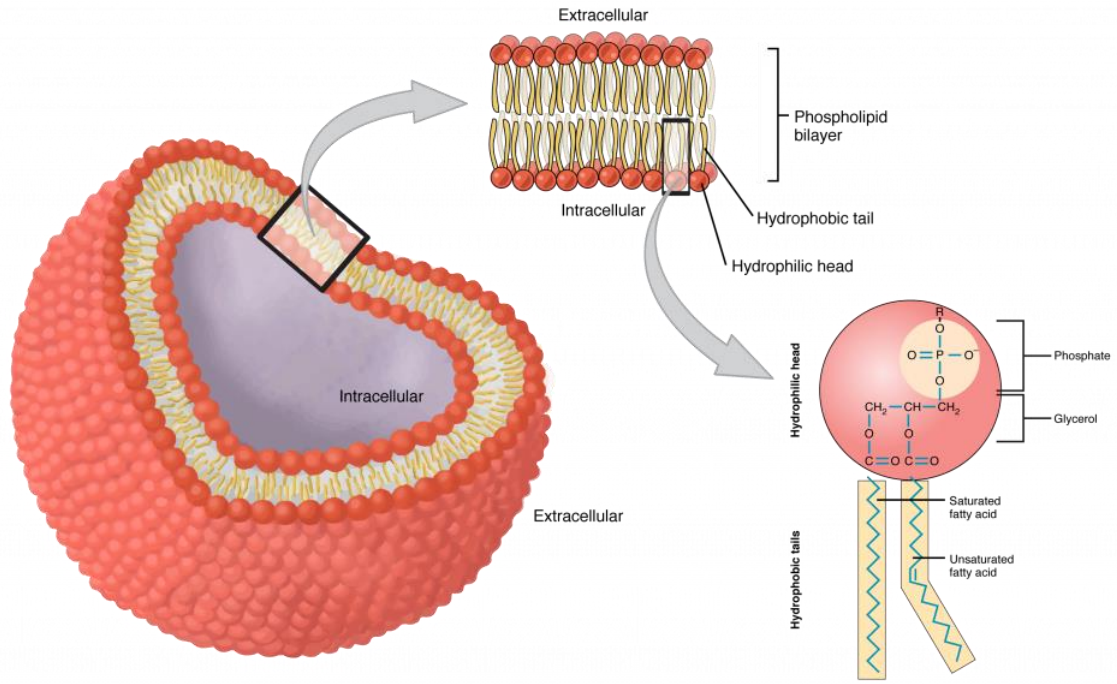
Food supplement for maintainance of brain function and health

CHALLENGES WITH AGING POPULATION

- The world's population is aging with almost every country experiencing a growth in the number and proportion of older people
- Expected challenge of aging population is the increased rates of health issues associated with aging, such as age-related cognitive decline
- No effective pharmaceutical treatments for cognitive impairment are available, emphasizing the **importance of prevention strategies**
- There is extensive evidence on how nutrients and bioactive compounds may impact frequent confusion and memory loss due to aging
- An important nutrient that is known to affect brain development and aging is **choline**

PHOSPHOLIPIDS

- Cell membranes consist of **phospholipids**
- Phospholipids work to provide pathways for various substances across membranes
- Cell membranes have a very high turnover rate
- Phospholipids must be continuously synthesized to ensure adequate function of cells
- Choline is a precursor for **phosphatidylcholine** (in cell membranes) and **acetylcholine** (in the brain), that contribute to the structural integrity of cell membranes and proper signaling functions in the nervous system



CHOLINE

- Choline is essential for several biological functions of cells
- Choline is involved in:
  - lipid synthesis and transport,
  - certain cellular reactions,
  - neural tube development,
  - many metabolic processes,
  - transporting excess triglycerides from the liver.
- When choline supplies are depleted, membrane phospholipids are broken down to provide choline for synthesis of acetylcholine

CHOLINE

- Plays an important role in the development of the brain for the developing fetus and newborn
- Adequate intake is especially important in pregnant and breastfeeding mothers
- Brain choline uptake is **decreased in older adults** and the lower supply of extracellular choline may contribute to **aging-related cognitive decline**
- Higher dietary choline intake is associated with better cognitive performance in elderly individuals
- One method to increase dietary choline is through **supplementation with citicoline** (CDP-choline or cytidine-5‘-diphosphate choline)

CITICOLINE

- Citicoline is a naturally occurring complex organic molecule that is **produced by the body** and found in all living cells
- Is **chemically identical to CDP-choline**, the natural precursor of the major cell membrane phospholipid phosphatidylcholine
- Citicoline quickly **breaks down into choline and cytidine** after oral consumption
- The cytidine component gives citicoline unique advantages as it rapidly metabolizes into **uridine**
- Uridine in the brain **helps to convert choline into phosphatidylcholine** for nerve-cell membrane growth
- Each of these compounds then enters their metabolic pathways which means that citicoline delivers all the benefits of choline

NEUROPROTECTIVE FUNCTION

- Citicoline has comprehensive neuroprotective properties
- Citicoline **prevents the break down of phospholipids** as it serves as a choline source, therefore protecting the neurons in brains to maintain neurotransmission
- As an exogenous source of choline, citicoline thus **spares membrane phospholipids** (in particular, phosphatidylcholine) and **prevents neuronal cell death**
- One of the mechanisms is also an **increase in sirtuin-1 level** (silent information regulator 1, SIRT1)
  - SIRT1 regulates neuronal aging and may also have neuroprotective effects
  - SIRT1 also exhibits a beneficial effect on neurodegenerative diseases such as Parkinson's and Alzheimer's diseases

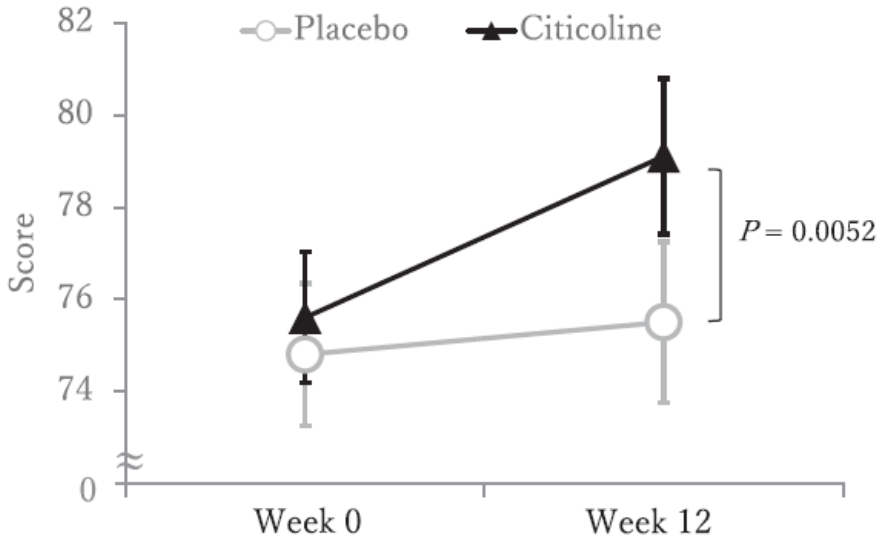
NEUROPROTECTIVE FUNCTION

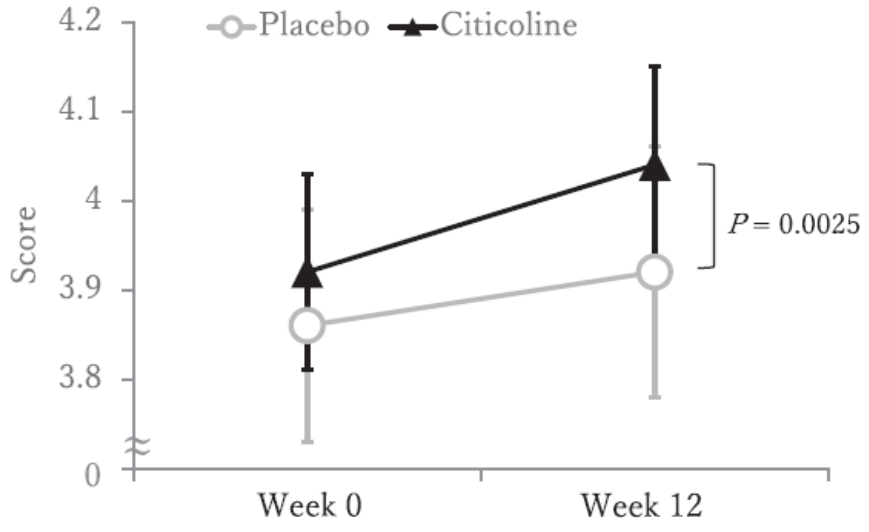
- The neuroprotective actions of citicoline include:
  - activating the biosynthesis of structural phospholipids in the neuronal membranes,
  - increasing cerebral metabolism, noradrenaline, and dopamine levels in the central nervous system,
  - preventing the loss of cardiolipin (an exclusive inner mitochondrial phospholipid enriched with unsaturated fatty acids)
  - protecting cell membranes by accelerating re-synthesis of phospholipids.
- Unsurprisingly, citicoline supplementation has shown **beneficial effects on memory function and behavior** in populations with a wide range of impairments such as those with mild to moderate vascular cognitive impairment, vascular dementia, or senile dementia

CITICOLINE SUPPLEMENTATION

- Studies have clearly demonstrated citicoline's effects on several cognitive domains such as:
  - improvement in both the immediate and the delayed recall of words and objects;
  - ameliorating short- and long-term memory, attention, and perceptual-motor ability, as well as behavioral and emotional control;
  - improvement in verbal memory functioning in older individuals with relatively inefficient memory.
- Citicoline has been uniquely found to also **support the production of dopamine, norepinephrine, and serotonin**
- Citicoline has the added advantage of **supporting mitochondrial function** and **energy production in the brain**

CLINICAL STUDIES





Randomized, double-blind, placebo-controlled parallel study of chronic (12 week) supplementation of 500 mg/d of citicoline in healthy adults with age-associated memory impairment showed an improvement in composite memory scores.

CITICOLINE SAFETY

- Ingestion of choline supplements has been linked to an increased concentration of compounds called TMA (trimethylamine) and TMAO (trimethylamine N-oxide)
- Elevated TMA and TMAO levels have been linked to higher heart disease risk
- The investigators have recently shown a 10-fold increase in plasma TMAO levels following supplementation with choline bitartrate supplements
- **Researchers proposed that citicoline is less likely than other choline sources to metabolize into trimethylamine (TMA) or its n-oxide (TMAO)**
- **Citicoline has an excellent track record of clinical safety**

VALENS CITICOLINE

- Food supplement in oral spray form that contributes to **brain health, better focus and attention and improved memory function**
- Contains a superior form **cytidine-diphosphocholine (CDP-choline)** which is naturally occurring in humans and has superior absorption rates
- Provides a safer form of choline as citicoline is less likely than other choline sources to metabolize into trimethylamine (TMA) or its n-oxide (TMAO)
- Contains vitamin B6 and B12 that **contribute to normal functioning of the nervous system and to normal psychological function**

Packaging:

ACTIVE INGREDIENTS

- In recommended daily dose (4 sprays – 0,8 ml):
  - Citicoline in form of cytidine-diphosphocholine: 250 mg
  - Vitamin B6: 1,4 mg (100% NRV*)
  - Vitamin B12: 5,0 µg (200% NRV*)

ADVANTAGES AT A GLANCE

- Innovative combination of citicoline and vitamins B6 and B12
- Form of oral spray
- Easy to use
- Natural cherry flavor for delicious taste
- **No added sugar, sweetened with xylitol**
- Produced in **GMP certified** plant
- Made in **Slovenia, EU**

VALENS®

FOR BETTER COGNITION

Thank you for your attention!