INTRODUCTION

In 1956 Rebecca Gerchman and Daniel Gilbert detected toxic effect of superoxid on aerobs. Till today there are identificated many free radicals. Their toxic effect is registrated in more than 100 diseases (malign diseases, arteriosclerosis, AIDS, arthritis...)

Free radicals are atoms and molecules with one or more unpaired electrons. They are highly reactive and cause cell damages acting on polyunsaturated fatty acids on cell membranes, proteins and DNA.They generates in organism in REDOX processes during normal cell metabolism. For example superoxid is formed during onevalent reduction of oxygen and it initiate chain reaction of new free radicals (hydrogen peroxide with its reactive hydroxyl radical) which cause oxidation of LDL.

Free radicals are produced by phagocytes, by smoking cigarettes, during exposition on jonizating radiation etc.

Antioxidants are molecules which can safely interact with free radicals and terminate the chain reaction before vital molecules are damaged. In organism they are found intracellular and extracellular.

Antioxidants are divided in 3 groups:

- Primary (SOD, GPx, ferritin and ceruloplasmin) has preventive function by inhibition of forming of new free radicals
- Secondary- inhibits development of chain reaction (vitamin E, vitamin C,
β-carotene, bilirubin etc)
-Terciar-taking part in repair of damaged biomolecules by free radicals, most DNA. (methionin sulfoxid reductase).

BIOASTIN

Bioastin is product that contains 4 mg astaxantin and 50 i.e. vitamin E (α-tocopherol) per tabl..

Carotenoids are family of around 700 substances soluble in oils.

Astaxantin is carotenoid that is found in many species of fish (mostly in salmon), crabs, herbs, birds, algae (mostly in Haematococcus), yeast and others.

Astaxantin is similar to β-carotens. Difference is in additional hydroxyl group and oxygen on two rings in molecule (picture 1)

Isolated, for the first time, in 1938 from sea crab (lobster) astaxantin is one of the most potent natural antioxidants. It protects cells against oxidation by quenching single oxygen scavenging free radicals and effectively breaks peroxide chain reactions.

α-Tocopherol is also oil soluble substance. It is natural antioxidant and powerful protector against peroxidation of fosfolipides of cellular and subcellular membranes. Tocopherol acts like breaker of chain of generation of new free radicals by transporting the phenol hydrogen on peroxide radical. Formed phenoxyl radical is unreactive except to other peroxide radicals.

MATERIAL AND METHODS

We examine 30 men with hyperlipidemia on age of 32-47 years old before application of Bioastin (1 tabl. per day) and 30 days after beginning of therapy.

In patients we determined total cholesterol, triglicerides, HDL-cholesterol, $ApoA_1$, ApoB and total antioxidant status (TAS). LDL-cholesterol was determined by Fridenwald formula.

Bioastin is product of Nutrex, Inc. Kailua Kona, Hawaii, USA.

For determination of total cholesterol, triglicerides, HDL-cholesterol, and TAS we used reagents of RANDOX ,Great Britain.For $ApoA_1$ and ApoB reagents of SENTINEL, Italy. Photometric measures were made on COBAS MIRA PLUS analizator (Hofman La Roche-Switzerland).

DISCUSSION

All examined patients before therapy had a concentration of total cholesterol above 6,7 mmol/l, LDL-cholesterol above 3,5 mmol/l, triglicerides above 2,29 mmol/l, concentration of HDL-cholesterol under 1,00 mmol/l.

Concentrations of $ApoA_1$ were lower than 1 g/L in 19 patients and ApoB higher than 1,6 g/L in 26 patients.

In 17 patients TAS was lower than 1,30 mmol/l.

The results of our studies showed (table 1 – figure 1) that there is decrease in the blood levels of total cholesterol (M 17 $\pm$ 4 %); triglycerides (M 24 $\pm$ 5 %); LDL-cholesterols (M 17 $\pm$ 2 %) and increasing of quotient $apoA_1$/apoB (M 10 $\pm$ 2,5 %).

Total antioxidant status (TAS) was not significantly increased after one month of therapy (M 4,5 $\pm$ 1,05 %).

Astaxantin and α-tocopherol are strong extracellular antioxidants.They neutrallize free radicals of superoxid, peroxide, oxidized LDL and that prevents reaction with oxygen atoms on polyunsaturated fatty acids on cellular and subcellular membranes.

Because of their oilsolubile nature they might have intracellular neutralizing activity on free radicals released in REDOX processes, most in mitochondria, and prevents proteins and DNA from reactive radicals. They prolong the antioxidant activity of intracellular antioxidants, most of superoxid dismutase (SOD).

These activities are probable cause for more efficient metabolism of cells, better enzymatic and transporting function of intracellular proteins which results with decreasing of aterogenic effect of cholesterol, triglicerides and LDL-cholesterol.

GRATITUDE

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