EFFECT OF UBIQUINOL ON OXIDATIVE STRESS, ANTIOXIDANTS AND PSYCHOLOGICAL MANIFESTATIONS IN CHILDREN WITH AUTISM

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INTRODUCTION

Autism is a range of complex neurodevelopmental disorders with multifactorial reasons which manifests within 3 years after the birth. Metabolic changes can involve antioxidants, oxidative stress and energy production in brain mitochondria.

Characteristic manifestations of autism include behaviour problems (hyperactivity, destruction, self-harm, aggression) and psychological functions (sleep and eating disorders).

Treatment of autism:

Supplementation with melatonin, L-carnitine, carnosine, vitamins, Mg, probiotics, omega-3-PUFA, Se, Zn, Fe and hyperbaric oxygen and music therapy.

Importance of coenzyme Q_{10} plasma level and supportive therapy with Ubiquinol is not known in children with autism.

AIM

was to develop a new diagnostic test and to examine the effect of supplementary therapy with **Ubiquinol (QH)** on behavior, psychological functions, antioxidant status a lipid peroxidation in children with autism.

PATIENTS AND METHODS

Children with autism: n = 24

Age: 3-6 years

Including criteria: according criteria of DSM IV (Diagnostic and Statistic Manual of Mental Diseases, USA) and using CARS (Screening test for autism). Children were examined by psychologists or neurologists.

Metabolic parameters:

$CoQ_{10\text{-TOTAL}}$ α-tocopherol, γ-tocopherol, β-carotene were measured by HPLC method with UV detector at 275, 295 and 450 nm, lipid peroxidation (TBARS) spectrophotometrically,

Meaurements in plasma: baseline values (before supplemntation) and after 3-months of liposomal liquid Ubiquinol supplementary therapy.

Daily dose. For the 1st week: 50 mg Ubiquinol.

After 7 days: 2 x 50 mg Ubiquinol/day

For statistical evaluation paired Student´s t-test was used.

Psychological tests:

25 questions were evaluated by parents before and after 3-months of QH supplementation.

References: [1] Chauhan A, Chauhan V. (2006), Patophysiology, 13: 171 -181. Rossignol DA (2009), Ann Clin Psychiatry, 21(4):213-236. [2] Gvozdjáková et al., General Physiol Biophys, 31/4, 2012.

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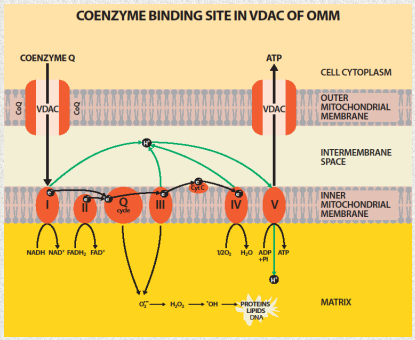
My warm thanks to prof. Fred L. Crane for consultation, especially to VDAC function.

Fig.1. Proposed novel mechanism of CoQ binding site in VDAC of OMM



VDAC (Voltage-Dependent Anion Channel)

Fig. 3. Potential mechanism of oxidative stress in autism [1]

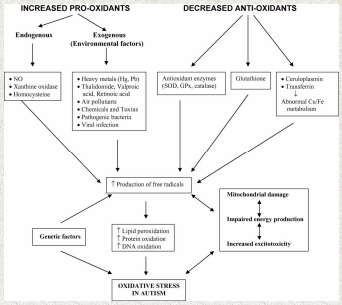


Fig. 5. Effect of Ubiquinol on playing and verbal communication in children with Autism

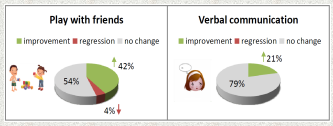
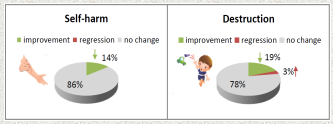
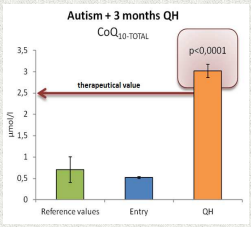


Fig. 6. Effect of Ubiquinol on self-harm and destruction in children with Autism



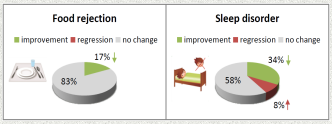
RESULTS

Fig. 2. Effect of Ubiquinol on $CoQ_{10\text{-TOTAL}}$ in plasma



Significant improvement was, when plasma concentration of $CoQ_{10\text{-TOTAL}}$ increased over 2.5 µmol/L.

Fig. 4. Effect of Ubiquinol on physiological functions in children with Autism



CONCLUSIONS

1./ Ubiquinol supplementary therapy in autistic children decreased TBARS and significantly improved communication with parents, verbal communication, activities, sleep and eating, playing games with friends, aggressivenes, self-harm, anger was, when plasma concentration of $CoQ_{10\text{-TOTAL}}$ increased over 2.5 µmol/L.

2./ Plasma concentration of $CoQ_{10\text{-TOTAL}}$ and lipid peroxidation could be used as metabolic markers of Ubiquinol supportive therapy in children with autism.

3./ Proposed mechanism:

NOVEL SITE for COENZYME Q FUNCTION in outer mitochondrial membrane through VDAC

Fig. 7. Effect of Ubiquinol on hyperactivity and aggression in children with Autism