

The Role of Cholesterol in Autistic Behaviors

By William Shaw, PhD

The concept of “good” and “bad” cholesterol is a frequent topic of conversation these days. While diet plays an important role in the formation of cholesterol, the genetic factors involved with the synthesis and transport of cholesterol are what typically predispose an individual to cholesterol-related health problems. Many people are unaware that much of our cholesterol is actually manufactured by our body’s own cells. Determining the significance of serum cholesterol values is not as simplistic as some might believe.

Discussions about cholesterol in the media are focused primarily on elevated levels in relation to cardiovascular risk; rarely taken into consideration are the risks associated with insufficient cholesterol values of 4.14 mmol/L ; 160 mg/dL or less. The truth is that low cholesterol can predispose people to violent behavior, suicide, depression, anxiety, delinquency, bipolar disease, Parkinson’s disease, manganese deficiency, celiac disease, hyperthyroidism, liver disease, malabsorption, and malnutrition¹. This is because cholesterol plays an important role in many physiological factors in the body. The formation of sterol hormones, cell membranes, and bile acids, would not be possible without cholesterol.

The brain is the most cholesterol rich organ in the body requiring a large amount to sustain the myelin sheath which coats nerve cells and helps conduct electrical impulses. Cholesterol plays a very important role in brain functioning. In one published study, participants with low, “desirable” cholesterol levels (less than 5.17 mmol/L ; 200 mg/dL) performed poorer on a range of cognitive functions than participants with borderline-high cholesterol levels (5.17-6.18 mmol/L ; 200–239 mg/dL) or high cholesterol levels (more than 240 mg/dL)².

The authors concluded that lower cholesterol levels in adults are associated with poorer performance on cognitive measures, which place high demands on abstract reasoning, attention/concentration, word fluency, and executive functioning. Lower cholesterol values were also found in chronic fatigue syndrome³ and in children with dyslexia⁴.

More recently, it has been discovered that cholesterol is needed to activate a protein called Sonic Hedgehog (SHH) which plays a central role in neural patterning, mood regulation, and cerebral developments⁵. This could be why individuals with cholesterol deficiency are more prone to aggressive behavior, lack of attention, increased number of infections, and motor difficulty⁶. Cholesterol is essential for the proper functioning of serotonin receptors which are responsible for good mood and oxytocin receptors needed for good social interactions and interpersonal bonding⁷.

It is not surprising then that a genetic condition which causes deficiency of cholesterol in the body called Smith-Lemli-Opitz syndrome (SLOS) is associated with autistic features⁸. Doctors and researchers have known about SLOS for decades, however most autistic children are not routinely screened for cholesterol deficiency because only a small portion of the autistic population carries this gene mutation. This paradigm may change in the near future due to recent research that shows cholesterol deficiency is common even in the autistic population without the SLOS gene mutation. Dr. Richard Kelly and Dr. E. Tierney at John Hopkins University involved in SLOS research investigated the incidence of cholesterol deficiency in blood samples from a group of subjects

with autism spectrum disorder (ASD) from families in which more than one individual had ASD, but not SLOS. Although no sample had values consistent with SLOS, 19 samples (19%) had total cholesterol levels lower than 2.59 mmol/L ; 100 mg/dL. The researchers found that cholesterol was low, not as a result of excessive breakdown, but because of reduced production. These extremely low values are considered to be in the fifth or lower percentile of normal children the same age⁸. The prevalence of cholesterol deficiency was confirmed at The Great Plains Laboratory, Inc. which performed cholesterol testing on 40 children diagnosed with ASD. Compared to the 19% of the Tierney study, 17.5% of those studied at The Great Plains Laboratory, Inc. had extremely low values under 2.59 mmol/L ; 100 mg/dL. In addition to the population which presented extremely low values, 57.5% of the children studied had moderately low cholesterol values of less than 4.14 mmol/L ; 160 mg/dL.

The children with SLOS and cholesterol deficiency who were given medical grade cholesterol supplementation quickly improved. Many children improved within days of taking cholesterol supplementation, even before cholesterol values had increased in the blood. This indicates that the improvements may be a result of cholesterol forming its derivatives – such as steroid hormones or bile salts. Parents reported that their children were sleeping through the night, overcoming aggressive behaviors, walking, speaking and becoming more responsive to family members. Other parents reported decreased rates of infections, reduced skin rashes, reduced self-injurious behaviors, improved muscle tones, rapid growth and improved behavior overall. It was reported that one autistic adult, without speech, even spoke for the first times.

Cholesterol screening is an extremely useful tool to determine if dietary changes and cholesterol supplementation are necessary. The Advanced Cholesterol Panel performed at The Great Plains Laboratory, Inc. includes reference ranges which take into account the significance of low cholesterol and also measure important markers in cholesterol transport, Apolipoprotein A-1 (Apo A-1), Apolipoprotein B (Apo B), Apolipoprotein a (Apo a) and homocysteine. The test is inexpensive and should be ordered routinely by physicians for their autistic patients. Parents of autistic children should seek testing for cholesterol deficiency without hesitation. If individuals have difficulty finding a doctor they may utilize GetSonicCholesterol.com, a service provided by Dr. Woeller. A pure medical grade cholesterol supplementation called “Sonic Cholesterol” is available with a physician prescription through New Beginnings Nutritionals for patients with cholesterol values that are below 4.14 mmol/L ; 160 mg/dL.

*These statements have not been evaluated by the FDA. This product is not intended to diagnose, treat, cure, or prevent any disease.

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