University of California, San Diego (UCSD) Suramin Autism Treatment-1 (SAT1) Trial (SAT1)

ClinicalTrials.gov Identifier: NCT02508259

Recruitment Status : Completed
First Posted : July 24, 2015
Results First Posted : July 16, 2019
Last Update Posted : July 16, 2019

Sponsor:
University of California, San Diego

Information provided by (Responsible Party):
Robert K. Naviaux, University of California, San Diego

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Study Description

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Brief Summary:
This study is designed to test the safety and efficacy of a single, intravenous dose of suramin in autism spectrum disorders (ASD).

Condition or disease	Intervention/treatment	Phase
Autism Spectrum Disorders	Drug: Suramin Drug: Saline	Phase 1 Phase 2

Detailed Description:
This study is designed to test a new theory of the origin and treatment of ASD. In this theory, ASD is caused by both genes and environment interacting to produce a persistent cell danger response (CDR; Naviaux RK, 2014) that interferes with and alters normal child brain development. Gut microbiome and immune systems are also affected. In this theory, the pathological persistence of the cell danger response is traceable to mitochondria, and maintained by purinergic signaling mediated by the release of extracellular nucleotides like adenosine triphosphate (ATP), adenosine diphosphate (ADP), uridine triphosphate (UTP), and uridine diphosphate (UDP). Suramin inhibits excess purinergic signaling by acting as a competitive inhibitor of nucleotide signaling at both ionotropic purinergic (P2X) receptors, and G-protein coupled, metabotropic purinergic (P2Y) receptors. Suramin has been found to correct the symptoms, metabolism, and brain synaptic abnormalities in two classical genetic and environmental mouse models of autism (Naviaux JC, et al. 2015; Naviaux JC, et al. 2014; Naviaux RK, et al. 2013). This study will test the safety and efficacy of a single dose of suramin in children with ASD. While it is not anticipated that a single dose will produce benefits for more than a few weeks, if successful, this study may lead to the development of newer and safer drugs for autism treatment.

Study Design

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Study Type :
Interventional (Clinical Trial)

Actual Enrollment :
10 participants

Allocation:
Randomized

Intervention Model:
Parallel Assignment

Masking:
Quadruple (Participant, Care Provider, Investigator, Outcomes Assessor)

Primary Purpose:
Treatment

Official Title:
The UCSD Suramin Autism Treatment-1 (SAT1) Trial

Study Start Date :
May 2015

Actual Primary Completion Date :

March 2016

Actual Study Completion Date :

April 2016

Resource links provided by the National Library of Medicine

Genetics Home Reference related topics: Autism spectrum disorder

MedlinePlus related topics: Autism Spectrum Disorder

Drug Information available for: Sodium chloride

U.S. FDA Resources

Arms and Interventions

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Arm	Intervention/treatment
Active Comparator: Suramin 20 mg/kg suramin in 50 ml of saline by intravenous infusion over 30 minutes	Drug: Suramin 20 mg/kg IV in 50 ml saline over 30 minutes Other Name: Germanin
Placebo Comparator: Saline 50 ml of saline by intravenous infusion over 30 minutes	Drug: Saline 50 ml IV over 30 minutes Other Name: Normal saline

Outcome Measures

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Primary Outcome Measures :

1. Autism Diagnostic Observation Schedule, 2nd Edition (ADOS2) [Time Frame: 6 weeks compared to baseline]

   ADOS2 comparison scores are units on a scale of 0-10. A score of 7-10 was required for enrollment. A score of 7-10 is diagnostic for autism spectrum disorder (ASD). The higher the score, the more severe the core symptoms of autism spectrum disorder. Scores of 6 and below are considered off the ASD spectrum.

2. Expressive Language [Time Frame: 6 weeks compared to baseline]

   Expressive One Word Picture Vocabulary Test (EOWPVT) scores are normalized for age. Typical language development produces a mean score of 100 with a standard deviation of 15. Outcomes for EOWPVT were expressed as the mean of the child-specific difference before and 6-weeks after treatment. For example, if the 6-week standard EOWPVT score was 59.6 and the baseline score was 63.8, the difference is -4.2 (= 59.6 - 63.8). A decrease in score at 6 weeks would corresponds to a decrease in language performance, while an increase, a positive difference, would reflect an increase.

Secondary Outcome Measures :

1. Aberrant Behavior Checklist (ABC) [Time Frame: 6 weeks compared to baseline]

   The full ABC is a 58-item parent rating with five factors: Irritability, Social Withdrawal, Stereotypy, Hyperactivity and Inappropriate Speech. Stereotypy is reported, and scores range from 0 to 21, with higher scores indicating worse behavior. A negative difference corresponds to decreased symptoms after treatment. A positive difference corresponds to increased symptoms after treatment.

2. Autism Treatment Evaluation Checklist (ATEC) [Time Frame: 6 weeks]

   The reported value is the Language sub-score of the ATEC, and the range for the language sub-score is 0-20. The higher the score, the worse the disability. Outcomes were measured at 6 weeks after treatment compared to baseline. A negative difference corresponds to a decrease in language disability, i.e an improvement in speech and language. A positive difference reflects an increase in language disability, i.e. a decrease in speech and language.

3. The Clinical Global Impression - Improvement Scale (CGI-I) [Time Frame: Overall ASD symptoms at 6 weeks]

   The CGI-I is scale that ranges from 1-7, reflecting the change in core autism behaviors after treatment. 1 is much improved, 4 is unchanged, and 7 is much worse.

4. Repetitive Behavior Questionnaire [Time Frame: 6 weeks compared to baseline]

   Total repetitive behavior was assessed using the Repetitive behavior questionnaire (RBQ), which has a scale from 0-87. Higher scores correspond to more severe repetitive behavior. Outcomes were analyzed as the difference in the score 6 weeks after treatment compared to baseline. A negative difference corresponds to improved behavior compared to baseline. A positive difference corresponds to worse behavior.

Eligibility Criteria

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Information from the National Library of Medicine

Choosing to participate in a study is an important personal decision. Talk with your doctor and family members or friends about deciding to join a study. To learn more about this study, you or your doctor may contact the study research staff using the contacts provided below. For general information, Learn About Clinical Studies.

Ages Eligible for Study:

4 Years to 17 Years (Child)

Sexes Eligible for Study:

Male

Accepts Healthy Volunteers:

No

Criteria

Inclusion Criteria:

- Autism diagnostic observation schedule (ADOS) score of ≥ 7
- Diagnosis of autism spectrum disorder by Diagnostic and Statistical Manual, 5th edition (DSM-V)
- Stable treatment and diet regimen for ≥ 2 months
- Resident of San Diego region

Exclusion Criteria:

- Any prescription medications
- Hospitalization within the previous 2 months
- Active medical problem such as seizures, heart, liver, kidney, or adrenal disease
- Planning to start a new drug, diet, or behavioral intervention during the study
- Weight under the 5th percentile for age
- Unable to tolerate venipuncture, urine collection, or an indwelling intravenous catheter for 3-4 hours
- Plasma creatinine ≥ 1.4 mg/dl
- Liver function alanine amino transferase (ALT) or aspartate amino transferase (AST) ≥ 1.5-fold above the upper limit of normal
- Known intolerance to suramin or other antipurinergic drugs
- Unable to perform or cooperate with study requirements

Contacts and Locations

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Information from the National Library of Medicine

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Please refer to this study by its ClinicalTrials.gov identifier (NCT number): ***NCT02508259***

Locations

United States, California

University of California, San Diego School of Medicine
La Jolla, California, United States, 92093

Sponsors and Collaborators

University of California, San Diego

Investigators

Principal Investigator: Robert K Naviaux, MD, PhD University of California, San Diego

More Information

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Additional Information:

Resource materials from the PI's lab website

Publications:

Naviaux JC, Wang L, Li K, Bright AT, Alaynick WA, Williams KR, Powell SB, Naviaux RK. Antipurinergic therapy corrects the autism-like features in the Fragile X (Fmr1 knockout) mouse model. Mol Autism. 2015 Jan 13;6:1. doi: 10.1186/2040-2392-6-1. eCollection 2015.

Naviaux JC, Schuchbauer MA, Li K, Wang L, Risbrough VB, Powell SB, Naviaux RK. Reversal of autism-like behaviors and metabolism in adult mice with single-dose antipurinergic therapy. Transl Psychiatry. 2014 Jun 17;4:e400. doi: 10.1038/tp.2014.33.

Naviaux RK, Zolkipli Z, Wang L, Nakayama T, Naviaux JC, Le TP, Schuchbauer MA, Rogac M, Tang Q, Dugan LL, Powell SB. Antipurinergic therapy corrects the autism-like features in the poly(IC) mouse model. PLoS

One. 2013;8(3):e57380. doi: 10.1371/journal.pone.0057380. Epub 2013 Mar 13.

Naviaux RK. Metabolic features of the cell danger response. Mitochondrion. 2014 May;16:7-17. doi: 10.1016/j.mito.2013.08.006. Epub 2013 Aug 24. Review.

Naviaux RK, Curtis B, Li K, Naviaux JC, Bright AT, Reiner GE, Westerfield M, Goh S, Alaynick WA, Wang L, Capparelli EV, Adams C, Sun J, Jain S, He F, Arellano DA, Mash LE, Chukoskie L, Lincoln A, Townsend J. Low-dose suramin in autism spectrum disorder: a small, phase I/II, randomized clinical trial. Ann Clin Transl Neurol. 2017 May 26;4(7):491-505. doi: 10.1002/acn3.424. eCollection 2017 Jul.

Responsible Party:

Robert K. Naviaux, Principal Investigator, University of California, San Diego

ClinicalTrials.gov Identifier:

NCT02508259 History of Changes

Other Study ID Numbers:

15-0134

First Posted:

July 24, 2015 Key Record Dates

Results First Posted:

July 16, 2019

Last Update Posted:

July 16, 2019

Last Verified:

June 2019

Individual Participant Data (IPD) Sharing Statement:

Plan to Share IPD:

Yes

Plan Description:

Safety, metabolomic, and completed outcome data will be made available to qualified institutional groups after peer review and publication.

Keywords provided by Robert K. Naviaux, University of California, San Diego:

mitochondria
purinergic signaling
cell danger response

Additional relevant MeSH terms:

Autistic Disorder
Autism Spectrum Disorder
Child Development Disorders, Pervasive
Neurodevelopmental Disorders
Mental Disorders
Suramin
Antinematodal Agents
Anthelmintics
Antiparasitic Agents
Anti-Infective Agents
Antineoplastic Agents
Trypanocidal Agents
Antiprotozoal Agents