

## Suramin and Autism

**COVID-19 update:** A Phase II clinical trial assessing the drug suramin as a treatment for autism is slated to begin in the spring of 2021, pending final approvals. [Read Autism and Suramin in the Time of COVID-19 response.](#)

[Suramin](#) is a 100-year-old drug developed to treat African sleeping sickness and river blindness. Though it has been investigated for other diseases, including cancer, it is not approved for any therapeutic use in the United States.

However, a small, randomized clinical trial conducted by [Robert Naviaux, MD, PhD](#), professor of medicine, pediatrics and pathology, and colleagues at University of California San Diego School of Medicine have found that a single intravenous dose of suramin produced dramatic, but transient, improvement of core symptoms of [autism spectrum disorder](#) (ASD). Currently, there are no drugs approved for treating the core symptoms of ASD.

More broadly, the trial findings support the “cell danger response theory,” which posits that autism and other chronic conditions are fundamentally driven by metabolic dysfunction—and thus treatable. Naviaux and his co-authors propose larger, longer clinical trials to assess suramin (or similar drugs) as an ASD treatment.

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### For Patients

Call UC San Diego Health  
main patient line  
858-657-7000

Contact the Naviaux Lab  
[naviauxlab.ucsd.edu/contact](http://naviauxlab.ucsd.edu/contact)

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bottle of suramin powder was given out free of charge for clinical trials of the first production batch. Credit: Science Museum, London.



**Special note from the researchers:** Suramin is not approved for the treatment of autism. Like many intravenous drugs, when administered improperly by untrained personnel, at the wrong dose and schedule, without careful measurement of drug levels and monitoring for toxicity, suramin can cause harm. Careful clinical trials will be needed over several years at several sites to learn how to use low-dose suramin safely in autism, and to identify drug-drug interactions and rare side effects that cannot currently be predicted. We strongly caution against the unauthorized use of suramin.

## Video

## Podcast



[UC San Diego Health](#)



n=17 Century-old drug tested in boys ...

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## Robert K. Naviaux, MD, PhD



Robert K. Naviaux, MD, PhD, professor of medicine, pediatrics and pathology, and co-director of the Mitochondrial and Metabolic Disease Center at UC San Diego School of Medicine, led the study that tested suramin in children with autism spectrum disorder. Credit: UC San Diego Health

## Mitochondria and Suramin



(Left) A colorized transmission electron micrograph of cellular mitochondria, which produce a small molecule called ATP. Inside cells, ATP serves as an energy source but released outside the cell, it acts as a danger signal. Suramin inhibits the signaling function of ATP, eliminating the cell danger response associated with autism. Credit: Thomas Deerinck, National Center for Microscopy and Imaging Research, UC San Diego. (Right) Developed in 1916 by German dye manufacturers Frederick Bayer and Co., Bayer 205 (later renamed suramin) was found to be effective against parasitic trypanosomes responsible for African sleeping sickness (trypanosomiasis). This