

Copper compound shows potential to slowing ALS

Steve Lundberg
Oregon State University

CORVALLIS, Ore. — A compound with potential as a treatment for ALS has gained further promise in a new study that showed it improved the condition of mice whose motor neurons had been damaged by an environmental toxin known to cause features of ALS.

ALS patients are categorized either as familial — meaning two or more people in their family have had the disease, which in their case is linked to inherited genetic mutations — or sporadic, which accounts for about 90% of the cases. Sporadic means the cause or causes are unknown.

The research by Joe Beckman at Oregon State University and collaborators at the University of British Columbia builds on a 2016 study by Beckman in which the compound, copper-ATSM, halted familial ALS progression in transgenic mice for nearly two years, allowing them to approach their normal lifespan.

The animals had been genetically engineered to produce a mutation of an antioxidant protein, SOD, that's essential to life when functioning properly but kills motor neurons when it lacks its zinc and copper co-factors and "unfolds." SOD mutations are present in 3% of ALS patients.

ALS, short for amyotrophic lateral sclerosis and

also known as Lou Gehrig's disease, is caused by the deterioration and death of motor neurons in the spinal cord. It is progressive, debilitating and fatal.

ALS was first identified in the late 1800s and gained international recognition in 1939 when it was diagnosed in a mysteriously declining Gehrig, ending the Hall of Fame baseball career of the New York Yankees first baseman. Known as the Iron Horse for his durability — he hadn't missed a game in 15 seasons — Gehrig died two years later at age 37.

Scientists have developed an approach to treating ALS that's based on using copper-ATSM to deliver copper to specific cells in

the spinal cord. Copper is a metal that helps stabilize the SOD protein and can also help improve mitochondria weakened by the disease.

The entire human body contains only about 100 milligrams of copper, the equivalent of 5 millimeters of household wiring.

"The damage from ALS is happening primarily in the spinal cord, one of the most difficult places in the body to absorb copper," said Beckman, distinguished professor of biochemistry and biophysics in the College of Science and principal investigator and holder of the Burgess and Elizabeth Jamieson Chair at OSU's Linus Pauling Institute. "Copper can be toxic, so its levels are tightly

controlled in the body. The therapy we're working toward delivers copper selectively into the cells in the spinal cord that actually need it. Otherwise, the compound keeps copper inert."

In the mid-20th century, it was discovered that indigenous residents of Guam frequently developed an ALS-like disease, known as ALS-Parkinsonism dementia complex (ALS-PDC), and its onset was linked to an environmental toxin produced by cycad trees, whose seeds provided food for animals the sickened people had hunted and ate.

In the new research, Michael Kuo and Chris Shaw at the University of British Columbia along

with Beckman used a similar toxin to induce ALS-PDC symptoms in mice, then treated the mice with copper-ATSM.

"With the treatment, the behavior of the sick animals was improved on par with the control animals," Beckman said. "Treatment prevented the extensive motor neuron degeneration seen in the untreated animals. These outcomes support a broader neuroprotective role for copper-ATSM beyond mutant SOD models of ALS with implications for sporadic ALS. It means the copper is doing more than just helping to fix the SOD. One result after another shows the compound is working pretty good."

Tumeric compound slows bone cancer

By Tina Hilding
Washington State University

PULLMAN, Wash. — A Washington State University research team has developed a drug delivery system using curcumin, the main ingredient in the spice turmeric, that successfully inhibits bone cancer cells while promoting growth of healthy bone cells.

The work could lead to better post-operative treatments for people with osteosarcoma, the second most prevalent cause of cancer death in children.

The researchers, including Susmita Bose, Herman and Brita Lindholm Endowed Chair Professor in the School of Mechanical and Materials Engineering, and graduate student Naboneeta Sarkar, report

on their work in the journal, ACS Applied Materials and Interfaces.

Young patients with bone cancer are often treated with high doses of chemotherapy before and after surgery, many of which have harmful side effects. Researchers would like to develop gentler treatment options, especially after surgery when patients are trying to recover from bone damage at the same time that they are taking harsh drugs to suppress tumor growth.

Turmeric has been used in cooking and as medicine for centuries in Asian countries, and its active ingredient, curcumin has been shown to have anti-oxidant, anti-inflammatory and bone-building capabilities. It has also been shown to prevent vari-

ous forms of cancers.

"I want people to know the beneficial effects of these natural compounds," said Bose. "Natural biomolecules derived from these plant-based products are inexpensive and a safer alternative to synthetic drugs."

However, when taken orally as medicine, the compound can't be absorbed well in the body. It is metabolized and eliminated too quickly.

In their study, the researchers used 3D printing to build support scaffolds out of calcium phosphate. While most implants are currently made of metal, such ceramic scaffolds, which are more like real bone, could someday be used as a graft material after bone cancer surgery.

Midday naps increase children's happiness, IQ

By Michele W. Berger
UC Irvine via the University of Pennsylvania

Ask just about any parent whether napping has benefits and you'll likely hear a resounding "yes," particularly for the child's mood, energy levels, and school performance. New research from the University of Pennsylvania and the University of California, Irvine, published in the journal SLEEP backs up that parental insight.

A study of nearly 3,000 fourth, fifth, and sixth graders ages 10-12 revealed a connection between midday napping and greater happiness, self-control, and grit; fewer behavioral problems; and higher IQ, the latter particularly for the sixth graders. The most robust findings were associated with academic achievement, says Penn

neurocriminologist Adrian Raine, a co-author on the paper.


"Children who napped three or more times per week benefit from a 7.6 percent increase in academic performance in Grade 6," he says. "How many kids at school would not want their scores to go up by 7.6 points out of 100?"

Sleep deficiency and daytime drowsiness are surprisingly widespread, with drowsiness affecting up to 20 percent of all children, says lead author on the study Jianghong Liu, a Penn associate professor of nursing and public health. What's more, the negative cognitive, emotional, and physical effects of poor sleep habits are well-established, and yet most previous research has focused on preschool age and younger.

That's partially because in places like the United

States, napping stops altogether as children get older. In China, however, the practice is embedded into daily life, continuing through elementary and middle school, even into adulthood. So, Liu and Raine, with Penn biostatistician Rui Feng, UC Irvine sleep researcher Sara Mednick and others, turned to the China Jintan Cohort Study, established in 2004 to follow participants from toddlerhood through adolescence.

From each of 2,928 children, the researchers collected data about napping frequency and duration once the children hit Grades 4 through 6, as well as outcome data when they reached Grade 6, including psychological measures like grit and happiness and physical measures such as body mass index and glucose levels. They also asked teachers to provide behavioral and academic information about each student. They then analyzed associations between each outcome and napping, adjusting for sex, grade, school location, parental education, and nightly time in bed.



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CLUES ACROSS

1. Cease
5. Soak
8. Fifty percent
12. Encouragement
13. Road covering
14. Oblong
15. Skin opening
16. Metallic rock
17. Staple food
18. Hi-fi
20. ___ out (distributed)
22. Pilgrim John ___
24. Look forward to
28. Extreme
33. Grassy spread
34. Waterlogged
35. Soda choice
36. Pushes against
38. Answer
39. Noodles
41. Zany
45. Yearned
50. Cropland measure
51. To each his ___
53. Holler
54. Front of the leg
55. Holiday egg drink
56. Furthermore
57. Withheld
58. View
59. Honk

CLUES DOWN

1. Has dinner
2. Horse's gait
3. Folklore giant
4. Social equal
5. Bar seat
6. Rowing blade
7. Ready the oven
8. Bugle
9. Enthusiastic
10. Tie, as shoes
11. Ran off
19. Wear away
21. "Stand ___ Deliver"
23. Put clothes on
24. High peak
25. Children's card game
26. Dazzle
27. Office holders
29. Cold cubes
30. Beat walker
31. "___ I Need"
32. Put
34. Arms
37. Place to get fit
38. Large rodent
40. Sprinkling
41. Cher film
42. Pang
43. Leak
44. Copper coin
46. Shellfish
47. Doughnut feature
48. Slacken
49. Plummet
52. Deep sorrow



Church Directory

<p style="text-align: center;">Church of Christ</p> <p style="text-align: center;">502 W. 2nd Street • Wallowa 541-398-2509</p> <p style="text-align: center;">Worship at 11 a.m. Mid-week Bible Study 7 p.m.</p>	<p style="text-align: center;">Grace Lutheran Church</p> <p style="text-align: center;">409 West Main -Enterprise</p> <p style="text-align: center;">SUNDAY WORSHIP at 9am Mission Project: "Bag It for School" School clothes for Foster Children phone (message): 541-426-4633 web: gracelutheranenterprise.com</p>
<p style="text-align: center;">St. Katherine's Catholic Church</p> <p style="text-align: center;">Fr. Thomas Pudupulliparamban 301 E. Garfield Enterprise</p> <p style="text-align: center;">Mass Schedule Sundays: St. Pius X, Wallowa - 8:00 am St. Katherine of Siena, Enterprise 10:30am Saturdays: St. Katherine of Siena, Enterprise 5:30am Weekday: St. Katherine of Siena, Enterprise - 8:00am (Monday - Thursday and First Friday) <i>All are welcome</i></p>	<p style="text-align: center;">St. Patrick's Episcopal Church</p> <p style="text-align: center;">100 NE 3rd St, Enterprise NE 3rd & Main St</p> <p style="text-align: center;"> 541-426-3439 Worship Service Sunday 9:30am</p>
<p style="text-align: center;">Joseph United Methodist Church</p> <p style="text-align: center;">3rd & Lake St. • Joseph Pastor Cherie Dearth Phone: 541-432-3102 Sunday Worship Service 10:00 am JosephUMC.org</p>	<p style="text-align: center;">Summit Church</p> <p style="text-align: center;">Gospel Centered Community Service time: 10:30 am Cloverleaf Hall in Enterprise 541-426-2150 Interim Pastor: Rich Hagenbaugh  www.summitchurchoregon.org</p>
<p style="text-align: center;">Enterprise Christian Church</p> <p style="text-align: center;">85035 Joseph Hwy • (541) 426-3449</p> <p style="text-align: center;">Worship at 9 a.m. Sunday School at 10:30 a.m. Evening Worship at 6 p.m. (nursery at A.M. services) "Loving God & One Another" David Bruce, Sr. - Minister</p>	<p style="text-align: center;">Christ Covenant Church</p> <p style="text-align: center;">Pastor Terry Tollefson Church Office: 541-263-0505</p> <p style="text-align: center;">Family Prayer: 9:30 am Worship Service: 10:00 am 723 College Street Lostine</p>
<p style="text-align: center;">Lostine Presbyterian Church</p> <p style="text-align: center;">Discussion Group 9:30 AM Worship Service 11:00 AM Childrens program during service Blog: dancingforth.blogspot.com 541.398.0597 Hwy 82, Lostine Stephen Kliever, Minister</p>	<p style="text-align: center;">Enterprise Community Congregational Church</p> <p style="text-align: center;">The Big Brown Church with an open door Pastor Archie Hook Sunday Worship 11am Bible Study 9:30am Ark Angels Children's Program Ages 4-6th grade, 11am Nursery for children 3 & under 301 NE First St. • Enterprise, OR Find us on Facebook! 541.426.3044</p>
<p style="text-align: center;">Wallowa Assembly of God </p> <p style="text-align: center;">702 West Hwy 82 Wallowa, Oregon 541-886-8445 Sunday School • 9:am Worship Service • 10:am Pastor Tim Barton Visit Us on </p>	<p style="text-align: center;">Seventh-Day Adventist Church & School</p> <p style="text-align: center;">305 Wagner (near the Cemetery) P.O. Box N, Enterprise, OR 97828 541-426-3751 Church 541-426-8339 School Worship Services Sabbath School 9:30 - 10:45 a.m. Worship Hour 11:00 a.m. - Noon Pastor Jonathan DeWeber</p>

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