

# RESEARCH HIGHLIGHTS

Selections from the scientific literature

## GENE THERAPY

### Quit smoking with a shot

Injecting a gene that encodes an anti-nicotine antibody into mice blocks the addictive chemical from entering the brain.

Ronald Crystal at Weill Cornell Medical College in New York and his team injected mice with a vaccine containing the gene. Viruses in the vaccine shuttled the gene to the liver. Once there, liver cells generated the antibodies, which bind to nicotine in the blood and prevent it from crossing the blood-brain barrier.

Mice that were administered the vaccine and then nicotine had only 15% as much brain nicotine as unvaccinated animals. Moreover, vaccinated mice did not show the increased blood pressure and heart rate that unvaccinated mice experienced after receiving nicotine.

*Sci. Transl. Med.* 4, 140ra87 (2012)

## NEUROSCIENCE

### fMRI translates thoughts to words

With minimal training, people can communicate silently through a functional magnetic resonance imaging (fMRI) machine by performing mental-imagery tasks that correspond to the 26 letters of the English alphabet.

Bettina Sorger at Maastricht University in the Netherlands and her team asked six healthy volunteers to use a set of three mental tasks. Each task could be performed for three different durations and

its onset delayed by three different lengths of time. This generated 27 different fMRI activation patterns, one for each letter and one for a space. In a one-hour fMRI scanning session, the volunteers spelled out their answers to open questions (**examples pictured**) by carrying out these mental tasks, with the help of a visual letter-encoding guide. A decoding algorithm translated the fMRI signals back into letters (**pictured, top three rows**) in real-time.

The technique could be used by patients who cannot

communicate physically but are still conscious.

*Curr. Biol.* <http://dx.doi.org/10.1016/j.cub.2012.05.022> (2012)

## ENVIRONMENTAL SCIENCE

### Future ozone from planes and boats

Emissions from aircraft and shipping are anticipated to be the dominant sources of increases in ground-level ozone, which can trigger respiratory disease.

Didier Hauglustaine and

Brigitte Koffi of the Laboratory of Climate and Environmental Sciences in Gif-sur-Yvette, France, used a global climate model to calculate the relative contributions of road transport, aircraft and shipping to the projected increase by 2050 in ozone pollution in Europe and the United States.

Nitrogen oxide emissions from aircraft will contribute more than 30% of the transport-induced increase in peak summertime surface ozone. Shipping emissions will, in some regions, account for up to 60% of the increase. Thanks to cars becoming cleaner, road transport will probably contribute little.

*Geophys. Res. Lett.* <http://dx.doi.org/10.1029/2012GL052008> (2012)



## EVOLUTION

### Fighters invest in body, not testes

Males that fight for the right to mate seem to invest less in testis size and more in body size compared with animals that do not fight — highlighting the trade-off that occurs between different strategies for reproductive success.

John Fitzpatrick at the University of Western Australia in Perth and his colleagues collated data on penis length, testis mass and the body mass of males relative to females in sea lions, walrus and seals, such as the Antarctic fur

seal (pictured).

In species that compete for a harem, greater body mass — useful in battle — is associated with reduced penis length and testis mass. This indicates that males that invest more in pre-copulatory strategies such as increased body size may do so at the expense of post-copulatory ones such as improving the quality of their ejaculates. *Evolution* <http://dx.doi.org/10.1111/j.1558-5646.2012.01713.x> (2012)

"Where did you spend your most recent vacation?"

- - U D - O E S T -  
I A V C A P C U U I  
A B C F B Y D R V A  
- B U D A P E S T -

"What did you like most in BUDAPEST?"

- S W N - E O F U E -  
A U X L A G X E V D A  
J T Y M O F M G S C R  
- S Y N A G O G U E -