In 2015, researchers reported another way to evade optical limits. A team led by Edward Boyden, a neuroengineer at the Massachusetts Institute of Technology in Cambridge, showed that inflating tissue — with the help of an absorbent compound used in nappies — moves cellular objects away from each other (F. Chen *et al*. *Science* **347**, 543–548; 2015). This technique, called expansion microscopy, led to leaps in microscope resolution and can resolve structures down to around 20 nm.

Shaib and Rizzoli's technique — described in a study posted to the bioRxiv preprint server last month — melds the two approaches to achieve resolutions below 1 nm. That is sharp enough to reveal the shapes of individual proteins, which are typically imaged in finer detail using much more expensive structural-biology methods such as cryo-electron microscopy (cryo-EM) or X-ray crystallography.

Expansion microscopy's simplicity is part of its appeal, says Boyden, who estimates that more than 1,000 laboratories have adopted the technique. Samples are treated with chemicals that anchor their proteins to a polymer that, with the addition of water, swells to 1,000 times its original size, moving the molecules apart. ONE (short for one-step nanoscale-expansion) microscopy uses heat or enzymes to also break the proteins apart, so that individual fragments are stretched in different directions during expansion.

The researchers have used their approach to record pictures of a neural molecule, the $GABA_A$ receptor, that closely resemble much-higher-resolution cryo-EM and X-ray crystallography maps of the protein. They have also captured the outlines of a bulky protein called otoferlin that helps to convey audio signals in the brain , for which the structure hasn't been determined. The shape resembles a structural prediction made by the AlphaFold deep-learning network.

The method cannot match the resolution of cryo-EM, which in some cases can reveal near-atomic-level details smaller than 0.2 nm. But cryo-EM can be finnicky and expensive. By contrast, ONE microscopy could offer a quick and easy way to obtain structural insights into just about any molecule, says Rizzoli. "You can look at any protein, and you can get resolution you couldn't dream about."

Increased accessibility

Rizzoli says that part of the motivation for developing the technique was to broaden the accessibility of cutting-edge light microscopy. The ONE-microscopy method is straightforward to apply and works with now-antiquated fluorescent microscopes from the 1990s.

Salma Tammam, a pharmaceutical technologist at the German University in Cairo, is planning to send a PhD student to Göttingen to learn the technique this summer. Her lab studies how nanoparticles move about in cells. The team would like to see the fine details of the particles and their cargo. But like many researchers in low and middle-income countries, they do not have access to expensive super-resolution microscopes. "This brings us resolution in an affordable manner," she says.

Broadening the reach of super-resolution microscopy is also important for scientists at well-funded institutions, says Noa Lipstein, a synapse biologist at Leibniz Center for Molecular Pharmacology in Berlin. She has access to a well-established super-resolution technique called stimulated emission depletion microscopy. But she has chosen to apply ONE microscopy to her research into the fine details of neural synapses.

"It's allowed me independence, because I don't have to rely on connections to big shots with heavy machines," Lipstein says. "This I can do in my own lab and my own bench."

Lipstein hasn't pushed the technique to its limits, but she's already getting glimpses of new biology. "It's almost a given that we are going to see new things. We already see them, but we don't know what they are," she says.

SCHOLARS DECRY FUNDING BAN FOR INDIAN RESEARCH CENTRE

The Centre for Policy Research conducts some of the country's most influential policy studies.

By Dyani Lewis

International researchers fear long-standing collaborations with Indian researchers might be imperilled by a decision by the Indian government to suspend foreign funding for the Centre for Policy Research (CPR), a think tank in New Delhi. Research projects at the CPR — which conducts some of India's most influential independent policy studies — have been paused temporarily after the Indian Ministry of Home Affairs suspended the think tank's government licence to receive overseas funds for 180 days or until further notice.

The move sparked an outcry among researchers, who are concerned that the funding pause could hobble the CPR and muzzle independent scrutiny of policy in India, which some say is threatened by Prime Minister Narendra Modi's government.

DASARATH DEKA/ZUMA PRESS WIRE/SHUTTERSTOCK

The effects of climate change are among the topics studied at the centre.

"CPR cannot survive in its present shape," says political scientist Christophe Jaffrelot at the French national research centre CNRS in Paris. Jaffrelot fears that the suspension will remain in place indefinitely and could spell the end of the think tank.

"This government action will scare away even potential domestic funders," says Vinay Sitapati, a political scientist at Ashoka University in Rajiv Gandhi Education City near Delhi.

The CPR conducts research into public policy in fields including climate change, social and economic policy, governance and infrastructure. Last year, it received about three-quarters of its grant funding from global organizations such as the Bill & Melinda Gates Foundation and the World Bank. Its domestic researchers have contributed to high-profile international studies such as reports by the Intergovernmental Panel on Climate Change.

"A permanent suspension — or rather cancellation — would result in a significant loss in available resources to undertake our research work and fulfil our institutional mandate," a CPR official told *Nature*.

The suspension relates to the CPR's registration to the Foreign Contribution (Regulation) Act, which is designed to ensure that foreign entities do not unduly influence Indian domestic politics. The law was amended by Modi's government in 2020 to increase government powers to regulate and scrutinize foreign payments to organizations. The Ministry of Home

Affairs has not said publicly why it suspended the CPR's registration and did not respond to *Nature*'s requests for comment.

Indian media outlets reported that the suspension order alleges the CPR has used foreign funds for purposes other than those permitted under its licence. The suspension comes on the heels of a tax investigation into the CPR last September.

In a March statement, the CPR denied any wrongdoing and said that it is cooperating fully with authorities. "We are in complete compliance with the law and are routinely scrutinized and audited by government authorities," it said. "There is no question of having undertaken any activity that is beyond our objects of association and compliance mandated by law."

Global outcry

Dozens of scholars worldwide have signed an open letter calling for the suspension to be lifted. "The CPR was the last independent think tank [in India] where researchers called a spade a spade," says Jaffrelot, who signed the letter. The CPR "has played an enormously important role in informing public-policy debate in India and internationally", says Frank Jotzo, an environmental economist at the Australian National University in Canberra.

Jotzo says that the CPR, established in 1973, has a long and esteemed history of providing objective and honest analysis of government policy, and has at times criticized Indian government policy and plans. "That is invariably the case with any independent, impartial think tank or organization anywhere in the world," he says.

Matthew Lockwood, an energy and climate policy specialist at the University of Sussex in Brighton, UK, says that the suspension will have a 'chilling effect' on research and policy debate in India. "The suspension sends a wider message that independent thinking is not wanted," he says.

Sitapati says that the CPR's contribution to global debates benefits low-income countries beyond India's borders. "CPR is a key Indian voice in international debates, speaking not just for India but for the developing world," he says. "On climate change, for example, CPR has played an invaluable role in shaping the conversation in a way that's alive to developing-country concerns."

The suspension applies to new funding, as well as to funding that the CPR has already obtained from international sources. Its latest annual report, for the 2021–22 financial year, also listed the MacArthur Foundation and the United Nations children's agency UNICEF among its largest funders.

The Bill & Melinda Gates Foundation declined to comment on the suspension. Other funding organizations did not respond to *Nature*'s requests for comment.

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Air pollution from vehicles and other sources is associated with millions of deaths every year.

HOW AIR POLLUTION CAUSES LUNG CANCER — WITHOUT HARMING DNA

Studies in mice suggest that tumour growth is triggered by inflammation caused by tiny particles.

By Heidi Ledford

Air pollution could cause lung cancer not by mutating DNA, but by creating an inflamed environment that encourages the proliferation of cells with existing cancer-driving mutations, according to a sweeping study of human health data and experiments in laboratory mice.

The results, published in *Nature*[1], provide a mechanism that could apply to other cancers caused by environmental exposures — and might one day lead to ways to prevent them. "The idea is that exposures to carcinogens could promote cancer without actually doing anything to the DNA," says Serena Nik-Zainal, a medical geneticist at the University of Cambridge, UK. "Not every carcinogen is a mutagen."

Cancer-causing pollution

Air pollution causes millions of deaths worldwide each year, including more than 250,000 from a type of lung cancer called adenocarcinoma. But it has been difficult to investigate how pollution triggers cancer, in part because its effects are less pronounced than are those of better-studied carcinogens such as tobacco smoke and ultraviolet light, says Nik-Zainal.

To unpick the mechanism, cancer researcher Charles Swanton at the Francis Crick Institute in London and his colleagues mined environmental and epidemiological data from the United Kingdom, Canada, South Korea and Taiwan. To diminish the contribution of tobacco smoke to the data, the team focused on lung cancers that carried mutations in a gene called *EGFR*. These mutations are more common in lung cancers in people who have never smoked than in those in smokers.

The team found that lung cancers bearing *EGFR* mutations were associated with exposure to air pollution in the form of inhalable particles with a diameter of 2.5 micrometres or less — less than one-tenth the width of the average grain of pollen. Such pollution is emitted by internal combustion engines, coal-fired power stations and burning wood.

To learn more, the team engineered laboratory mice to carry an *EGFR* mutation associated with human cancer. Mice exposed to particles similar to those found in air pollution were more likely to develop lung tumours than were control mice that were not exposed.