

TROPICAL DISEASE

Snake venom-producing organoids

Cell **180**, 233–247 (2020)



Credit: Gallo Images/Alamy Stock Photo

Snake venom glands can be cultured as adult stem cell–based organoids that produce toxins for further study into this public-health challenge.

Snakes can kill prey substantially larger than themselves through one injection of their venom by bite. The resultant envenoming events are responsible for around 100,000 deaths per year. For the development of better antivenoms, better understanding of the venom is required, and we currently lack a stable source for study.

Post and colleagues used venom glands to derive stable organoids from the Cape coral snake that recapitulated the heterogeneity seen in adult organs. These secreted functionally active toxins and so could be a source for future study. HS

<https://doi.org/10.1038/s41591-020-0780-0>

CANCER

AI for breast-cancer screening

Nature **577**, 89–94 (2020)

An artificial intelligence system that can identify breast tumors from mammograms outperforms humans at the same task.

Early detection of breast cancer can considerably improve outcomes, and screening mammography helps make this possible. Currently, mammograms are interpreted by trained experts, but there are high rates of both false positives and false negatives.

McKinney and colleagues developed a deep learning–based model for identifying breast cancer in screening mammograms and tested it on two datasets from the UK and USA. They found that the artificial intelligence performance was better than that of radiologists and show how it could be integrated into clinical workflows in the future. HS

<https://doi.org/10.1038/s41591-020-0776-9>

ANTIMICROBIALS

Antibiotic tolerance leads to antibiotic resistance

Science **367**, 200–204 (2020)

Antibiotic tolerance can be a precursor to antibiotic resistance in the presence of multi-drug combinations.

The development of antibiotic resistance, in which a bacterium evolves a survival mechanism that circumvents the drug target, resulting in a less-effective drug, is a widespread public-health emergency and limits treatment options. Antibiotic tolerance, in which bacteria become less susceptible to the therapy, resulting in a longer time to killing, is another means by which the effectiveness of a therapy is reduced. However, it is not known if or how this contributes to resistance.

A group of scientist in Israel analyzed sequential isolates of methicillin-resistant *Staphylococcus aureus* from patients, and also carried out evolution experiments on these strains. They found that antibiotic tolerance is important in evolution of resistance and should be taken into account in treatment regimens. HS

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CARDIOVASCULAR DISEASE

Smoking cessation and type 2 diabetes

Lancet Diabetes Endocrinol. **8**, 125–133 (2020)

For those with type 2 diabetes, quitting smoking reduces the risk of developing cardiovascular complications, even if there is subsequent weight gain.

Quitting smoking reduces the risk of developing cardiovascular disease and is particularly important for those with type 2 diabetes. However, smoking cessation is often followed by weight gain, and it is unclear if this can negatively affect any health benefits.

Liu and colleagues analyzed data from the Nurses’ Health Study and the Health Professionals Follow-Up Study and found that smoking cessation without subsequent weight gain reduced the risk of cardiovascular disease and mortality in smokers with type 2 diabetes. In those with type 2 diabetes who gained weight after they quit smoking, there was still benefit with respect to cardiovascular disease mortality. HS

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RHEUMATOLOGY

A successful phase 3 trial for lupus *N. Engl. J. Med.* **382**, 211–221 (2020)

A phase 3 drug trial of treating systemic lupus erythematosus with anifrolumab, an antibody that prevents signaling through the receptor for type I interferons, resulted in a clinically meaningful response in close to half of the people treated.

Lupus is a heterogeneous systemic autoimmune disease that can lead to organ failure. There is no cure, but treatment includes alleviation of symptoms. The pathogenesis of this disease is known to be linked to the interferon pathway; however, this knowledge is yet to result in the development of a successful therapy.

The TULIP-2 trial included 362 patients, of which 182 received anifrolumab and 180 received a placebo. The treatment was able to induce a response in 48% of those treated, including a reduction in the glucocorticoids these people needed to take and the severity of their skin disease. HS

<https://doi.org/10.1038/s41591-020-0777-8>