nature
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Biomedical sciences

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Nature Index 2022 Biomedical sciences, a supplement to *Nature*, is produced by Nature Portfolio, the flagship science portfolio of Springer Nature. This publication is based on data from the Nature Index, a Nature Portfolio database, with a website maintained and made freely available at natureindex.com.

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Gene therapy – which aims to treat genetic conditions by altering the genes that underlie the problem – has had something of a turbulent history. When it was first mooted half a century ago, researchers were enthusiastic about the prospect of treating the underlying causes, rather than just the symptoms, of persistent and complex genetic disorders. Then came the recognition that changing the DNA of a sufficient number of cells in an organ to create meaningful results was an uphill struggle. Now, however, scientists are finally making headway and bringing gene therapy out of its 'dark age' (see page S24).

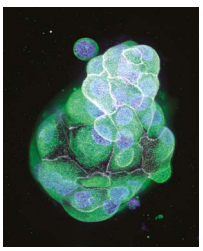
This renewed progress is representative of where the biomedical sciences now finds itself more generally. Long-pursued innovations are finally maturing to become game-changers. Organoids, complex 3D multi-cell tissues, are changing how *in vitro* experiments are performed, for example, giving scientists a more accurate picture of how biological processes might play out in real organs. Organoid research is also helping to plug the gaps in the study of diseases for which suitable animal models are lacking (see page S34).

Optimism in the field is enhanced by the successes in finding vaccines to counter COVID-19. In this supplement, we use the Nature Index Share* metric to show how the output of biomedical research has varied across different countries and territories during the pandemic (see page S28).

There is cause for pessimism in other areas of biomedical research. Antimicrobial resistance, for example, is a stubborn problem. The zeal from policymakers, funders and pharmaceutical firms searching for a COVID-19 vaccine is lacking in the hunt to find new antibiotics (see page S32). Unless this situation changes, experts warn that infections caused by resistant strains of bacteria could be causing 10 million deaths per year by 2050.

Benjamin Plackett
Locum senior editor, Nature Index

**Nature Index's signature metric Share, used in this supplement, is a fractional count for an article allocated to an institution, city or country/region, that accounts for the proportion of authors on the article whose institutional affiliation is with that institution or location. Adjusted Share accounts for the small annual variation in the total number of articles in the Nature Index journals. We point out that the Nature Index provides just one indicator of research performance, and many other factors must be taken into account when assessing the quality of research or institutions.*



On the cover: Micrograph of a colon cancer organoid culture. Credit: Torsten Wittmann/SPL

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