



# European Biotechnology

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Industry **Magazine**

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## Interview

Immatics Bio-  
technologies CEO  
Harpreet Singh  
explains how  
TCR-T cell therapy  
can combat  
cancer.



**FREE EXCERPT**

Biomolecular Condensates

# Droplets & Disease

### COVID-19

Industry struggles to overcome  
paralysis caused by SARS-CoV-2

### Novel Food

Emerging sustainable solutions  
for protein production

### Biofairs Compass

The ultimate guide to leading  
Life Sciences Events in H2/2020

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# Support the Year of Investors in Antimicrobial Resistance



**PROFESSOR DAME SALLY DAVIES** is the UK Government's Special Envoy on Antimicrobial Resistance (AMR). Dame Sally was the Chief Medical Officer for England and Senior Medical Advisor to the UK Government from 2011–2019. She is a leading figure in global health, serving as a member of the World Health Organisation (WHO) Executive Board and as co-convenor of the United Nations Inter-Agency Coordination Group on AMR. She has championed the need to address AMR across human and animal health, agriculture, and environment within the UN family and globally.

*We call on investors to include antimicrobial resistance (AMR) in your Environmental, Social, and Governance (ESG) frameworks. ESG is already driving market outlooks and investor portfolios. Sustainable investments are building resilient supply chains, meeting increasing and evolving global consumer demand, and creating brand and asset value. You, as investors, will shape ESG practices throughout 2020 and beyond.*

*Effective antibiotics are critical for each of the E, S, and G pillars, and for the 2030 Sustainable Development Goals (SDGs) agreed upon by all nations at the UN. In a world with antibiotics, modern medicine thrives, and investments in healthcare, water, and food production profit. But, effective antibiotics are rendered ineffective by over-consumption around the world, leading to AMR. It follows, therefore, that in a world without effective antibiotics, food, pharma, healthcare, and insurance sectors, for a start, risk disruption and devaluation.*

*In our globalised world, antibiotics are used and misused by humans in all sectors, including human health, animal health, and agriculture. Intensive livestock farming and poor animal husbandry currently over-rely on antibiotics to prevent diseases, and, outside the EU, to promote growth, to meet consumer demand, and to generate quicker, larger profits. Farming and food production can both cause and spread AMR, which means sick patients and animals can die. This hits investors' bottom lines and will continue to do so unless we take sufficient action.*

*Drug-resistant infections are already reducing labour productivity and economic output, presenting ongoing risks to investors. Without urgent action, AMR will cause 10 million deaths per year by 2050 and cost the global economy in excess of US\$100 trillion. On micro-levels, production costs will increase, and consumer purchasing will move away from livestock farmed with high levels of antibiotics. Yet, this is not a problem for the future. Canada estimated that drug-resistant infections cost their economy an additional CA\$1.4 billion in 2018.*

*Governments, investors, and industry all have roles to play in reducing risks of AMR for patients, animals, and crops, and lessening the impact on our global economy. Reducing antibiotic usage in humans and livestock farming, practicing good hygiene and husbandry, and supplying appropriate vaccines will maintain our ability to treat human and animal infections. Building end-to-end sustainable supply chains will develop our health and environmental systems and support the delivery of the UN's SDGs. If we act at global, national, and individual levels to contain AMR, then investors stand to make long-term, sustainable returns on their investments.* ■

FREE EXCERPT

## COVER STORY



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## The promise of condensate medicine

In January, Dewpoint Therapeutics garnered US\$60m in financing. Then Bayer signed a US\$100m licensing contract with the US-German company, which is taking a completely new approach to drug development. Is it science fiction, or will we soon be able to restore 'healthy' gene expression in patients suffering from cancer, Alzheimer's or MS? The company's founders say it's possible – if we solve the metabolic mysteries found in constantly changing cellular droplets.

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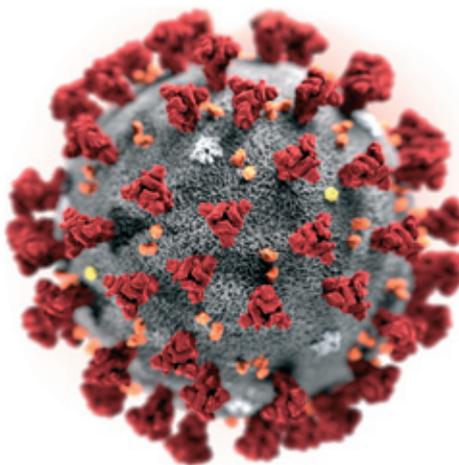
## Lab-grown food

Cultured meat alternatives are gaining momentum. Start-ups in the field are attracting millions in financing, and are also teaming up with biopharma companies and manufacturers to move forward industrial scale-up processes. A first wave of companies is entering the home stretch, among them European firms like Mosa Meat and Peace of Meat.



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## COVID-19



6/55/70

## Viral pandemics

The COVID-19 crisis has clearly shown how vulnerable our populations, economies, political and healthcare systems are when dangerous and highly contagious pathogens emerge and begin spreading rapidly. Despite a number of efforts to improve diagnostics, as well as develop vaccines and new treatments or repurpose existing ones, it will take time before we have a widely applicable therapy. An overview of a planet in the midst of a pandemic.

## EDITORIAL

## Brexiting science

Post-Brexit, the European Commission and Member States have to cope with a €75bn reduction in the EU's next seven-year budget. At the end of February, EU leader negotiations to fill the hole left by the UK's departure from the bloc failed. The Netherlands, Austria, Denmark and Sweden refused to increase their contributions to boost the Cohesion Funds and the Common Agriculture Policy (CAP) by €4.4bn – including project funding of €2bn to help support future technologies driving a sustainable bio-economy. COVID-19 has made the situation even worse.

In the end, what would a reduced budget mean for European research and innovation? Like the four countries mentioned above, Luxembourg is a net contributor. Its Prime Minister Xavier Bettel says: "I see the EU as a chance, and not as a bill". EC President Ursula von der Leyen has warned that "we will have no budget, we will have no Erasmus Programme, no resources for research, no resources for regional development or border protection" if there is not a solution by December.

The current EC proposal foresees budget cuts of about €10bn per year compared to the original proposal that resulted in a Horizon Europe budget, and 27% instead of 30% more money for climate reduction. That money is desperately needed to drive innovation. Researchers need to speak out!



Thomas  
Gabrielczyk  
Editor-in-Chief

## SPECIAL

## EU Event Compass

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# Life in a bubble – droplet science

**RESEARCH ADVANCES** It's a discovery that revolutionises our fundamental understanding of cells. Tiny droplets called condensates that form through weak interactions between proteins and RNA are at the heart of many key biological processes. Dewpoint Therapeutics – the first start-up to harness the basic research for a new therapeutic platform technology – is now opening a facility in the German capital Berlin.

Phillip Sharp almost gave up. For practically his entire career, the Nobel-prizewinning biochemistry researcher at the Massachusetts Institute of Technology struggled to clarify one of the fundamental unsolved riddles of biology. How do the millions of tiny molecules within a cell come together at exactly the right time and the right place at the right concentration to perform all the necessary chemical reactions that are the beating heart of life itself? The transcription process, for instance, which is at the center of genetic information and its transmission? That's Sharp's specialty. "We've been thinking about gene expression for decades, and we were all still saying: 'Transcription factors come to the DNA somehow, and then they perform the transcription and terminate it, somehow.'" But how exactly? "We didn't know how to think about it," says the 75-year-old, who still works in his lab at MIT's Koch Institute for Integrative Cancer Research. "I basically turned my back on the subject, because I couldn't figure out how to do anything about it."

But then, in 2012, a British cell biologist came to the rescue. While studying structures called P granules in stem cells, he stumbled on a phenomenon that fundamentally changed how molecular biologists think about how chemical reactions are processed in living beings. It would prove a breakthrough.

Sharp thinks "it's at the heart of basically every biological process." Almost every task a cell has to perform involves dozens to thousands of different proteins or other chemical molecules, all interacting like workers and machines in a factory. But where production steps in a factory follow strict plans in terms of time and place, biologists had no clue how all the different molecules drifting through a cell's cytoplasm are able to come together to form the complexes that perform basic living processes – and then dissolve again afterwards.

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**"If there is a disease pathway that involves a condensate, then we can take advantage of that and can modulate that activity."**

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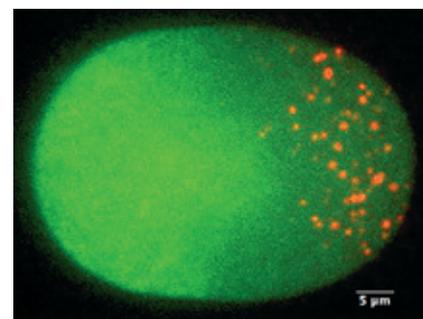
What signals call them to duty? Biology textbooks don't hold the answer, although it's an essential one. After all, if team play isn't working at the molecular level, it results in diseases like Alzheimer's, Parkinson's and cancer. So knowing the answer to that question would potentially open up ways to tackle these devastating illnesses. "Tony Hyman made the essential discovery," Sharp says. A stroke of luck, as Hyman nearly didn't become a scientist in the first place.

Unlike others, Hyman says he wasn't drawn to the natural sciences from a young age. He didn't perform extremely well in high school either, and was unsure afterwards which direction to pursue professionally. So he took a temporary job at University College in London paying £30 a week tending to stem cell culture media and performing other background lab-tech work.

## Densely packed with colloids

One of the scientists there convinced him that life under the microscope was fascinating, made him start an experiment, and encouraged his curiosity. One Friday evening, when the technicians and researchers had disappeared for the [...]

**>> Read the full story in the printed issue.**



**P granules (red), like in a one-cell-stage nematode embryo, are condensates necessary for germ line development.**



Mosa Meat hamburgers are  
made with cultured cells.

# Upscaling in the race to culture meat

**NOVEL FOODS** The concept of meat grown in the lab is gaining momentum. Firms in the field attract financing rounds worth millions, and are also teaming up with biopharma companies and manufacturers to accelerate industrial scale-up. A first wave of companies is pushing the envelope, with US-based Memphis Meat among the leaders. European start-ups like Mosa Meat or Peace of Meat are farther back in the pack. They aim to have production up and running by 2022.

The goals are ambitious. “The vision we want to offer is delicious meat with a global impact on sustainability at a very competitive price for mass consumers,” Maarten Bosch says. He’s the CEO of Mosa Meat, one of the frontrunners in the cultured meat space. When the Dutch company presented the world’s first hamburger made from cultured cells back in 2013, the scientists were taking the first steps on a long journey filled with technological challenges to cultivate meat from a biopsy. Back then, the hamburger that made headlines cost €250,000. Most of the work was financed by Google co-founder Sergey Brin.

Since then, the Netherlands-based company has grown. It now employs over 40 staff, and is in the process of moving into a new facility outside the university labs it has occupied until now. In late December, the company reached another major milestone when it published a new method for creating serum-free media for the growth of primary bovine myoblasts. “Instead of using pricy fetal bovine serum, which is actually drawn from fetal calves, we have developed a plant-based replacement that performs as well as serum-derived medium to grow the meat cells,” Bosch told EUROPEAN BIOTECHNOLOGY. Currently the company is preparing to transform its lab-proven process of cell differentiation

and tissue formation into large-scale settings. “Some parts of the process have been done already at a large scale, some haven’t. We’re able to make a few hamburgers, but we need to make millions or billions of hamburgers,” Bosch says. “It’s now about producing large volumes and bringing down costs. We can



**MAARTEN BOSCH**  
CEO of Mosa Meat (Maastricht,  
The Netherlands)

? Could you briefly explain your current action plans and your next steps and goals?

! It’s now about producing large volumes and bringing down costs. We can do it, but we have to prove it. The ambitious goal is to have our pilot plant operational in 2021, and to start the first industrial production line in 2022.

do it, but we have to prove it. And we will need to create a complete new value chain and ecosystem.” The CEO knows his firm will need strong partners to be as quick as possible. Merck’s investment arm, M Ventures, is already supporting Mosa Meat, as is Swiss meat producer Bell Food Group. In a next step, the company is focusing on setting up a first pilot plant, and is pursuing a new major financing round. “The goal is to have the pilot plant operational in 2021, and to start the first industrial production line in 2022,” outlines Bosch.

In January, the company announced a new strategic partnership with animal nutrition company Nutreco, which will help provide a large-scale version of the nutrient-filled medium used to grow the meat. Nutreco also pledged an undisclosed amount of funding to Mosa Meat, as did climate-minded investment firm Lower-carbon Capital. During the course of the year, Bosch hopes to attract further partners able to provide support with capital and/or strategic knowledge. “We see a lot of interest in this space, but we will be selectively looking for those who provide a strategic fit to our plans,” the CEO explains. One aspect of the firm’s strategy is to remain as European as possible, and initially launch in the EU, although Bosch is aware that regions like the US [...]

>> Read the full story in the printed issue.



# Euro BioFairs Compass

1<sup>st</sup> Edition 2020

## II Guide to Life Sciences Events



**SPECIAL**

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