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Interview

Swedish Research
Minister Helene
Hellmark Knutsson
on Nordic strengths
in healthcare and
bioeconomy



Drug Development

Big Pharma adds human
induced pluripotent stem cells
to its drug screening toolbox

Open Innovation

Pharma giants slowly open
doors to improve research
and development processes

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A European SME alliance tables
proposals to solve the ongoing
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EuroBioFairsCompass

Your unique guide to the top life
sciences events in December and
the first half of 2016



FREE EXCERPT

Jet biofuels

Solving aviation's CO₂ dilemma



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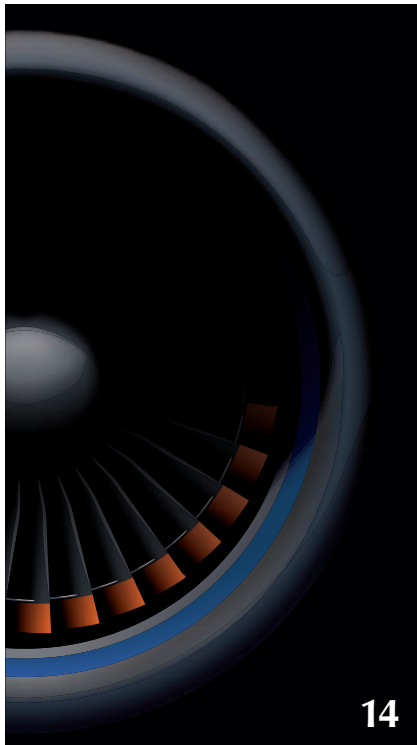
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COVER STORY



Jet biofuels threatened by cheap oil

Since the first certification of a bio-based jet fuel in 2011, more than 20 airlines have completed over 1,600 commercial passenger flights with blends that also included sustainable propellants. The aviation industry has made commitments to cut overall emissions of carbon dioxide by 2050 by 50%, and biofuels play a vital role in those plans. Tumbling prices for crude oil, however, have complicated the future for renewable alternatives.

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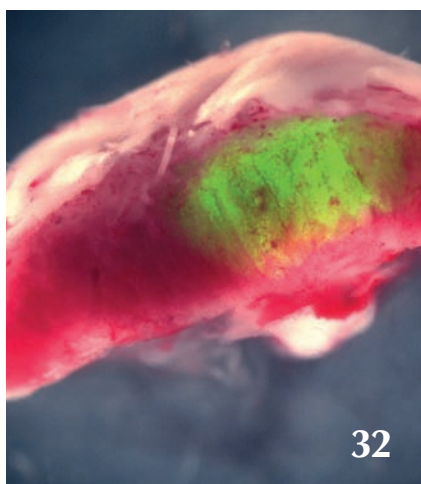
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STEM CELLS

A new dawn in drug development?

Since their discovery in 2007, induced pluripotent stem cells have made quite a splash. Now the first compounds discovered using human-cell models for disease have arrived at the clinical testing stage. If iPSCs prove to predict clinical outcomes better, it will change the face of drug development.



DRUG DEVELOPMENT



Open innovation in the pharma industry

In the top-secret, secluded sphere of pharma development, there's a fine line between getting the help you need to get your project to work and providing rivals with too much information. Despite the dangers, more and more pharma companies are embarking on a course of open innovation.

EDITORIAL

Go biotech!

Many people now view "biobased" as a synonym for sustainability – even though not all that appears green is actually sustainable. Most "biobased" plastics don't degrade in nature, for example, and palm oil monocultures in Indonesia and Malaysia are threatening the world's oldest rain forests.

Even promising approaches like the aviation industry's goal to reduce its greenhouse gas footprint by 50% are challenged by economic realities, as *EUROBIOTECH* editor Bernd Kaltwasser reports in our cover story on biobased jet fuel (see p. 14).

And more progress is expected from biotech innovators in the pharmaceutical sector. As reported on p. 32, almost all Big Pharma companies have teamed up in precompetitive projects to derive human stem-cell based models that mimic human disease. The first compounds identified using the fresh approach have just arrived in Phase II development.

Big Pharma attempts to join forces and team up with innovative biotech companies to improve R&D quality and output is not only reflected in Public Private Partnerships. Martin Laqua reports on why most pharma majors have also kicked off open innovation initiatives all on their own (see p. 78). And open innovation approaches will have to be applied to bio-based projects to produce an outcome that's truly sustainable.



Thomas Gabrielczyk
Editor-in-Chief

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FREE EXCERPT

The truth about GM feedstuffs

AGRI-BIOTECH Food safety has become a critical issue for both industry and policy makers. High profile food scares over the last few decades – from the outbreak of Mad Cow Disease in the 1990s, to the horsemeat in beef products scandal a couple of years ago – have shaken consumer confidence in the safety of food products. This has cost businesses billions of euros in lost earnings and prompted calls for ever tighter traceability and more transparent labelling of products. Very few anecdotal accounts on the potentially negative impacts of GM crop consumption on domestic animals have been published so far. Until now, there has been no comprehensive data on the long-term health effects of GM feed on animals and other GM feed-related risks such as allergies.

Outcomes from a three-year EU-funded project, in which all available data available on GMO-mediated health effects on animals were collected from the scientific literature and from surveys of farmers, point to no adverse health effects on livestock animals fed GM ingredients. On the contrary, several reports indicate that insect-resistant GM crops may contain lower levels of toxic chemicals produced by fungi that can colonise insect-damaged crops. All data collected by the researchers of the Marlon (“Monitoring of Animals for Feed-related Risks in the Long Term”) project are available through a searchable database dubbed IPAFed, which covers studies on short-term and long-term adverse health effects of GMOs on animals. Data from scientific papers include detailed descriptions of each study, accessible results and links to sources. In addition, the 11 project partners from eight countries carried out surveys in their respective nations. They also collated information on measurable animal health indicators and how best to analyse exposure. Tools and guidelines to help monitor the long-term health of animals exposed to feed derived from GM crops have also been developed. ■

Heard in Brussels

Biotech in agriculture lives another day

BRUSSELS *People do plenty of moaning about the European Parliament, so let's look at something good that it did in October, when it rejected an EC proposal for national GMO bans.*

This isn't cultivation of GMOs – countries already have the right to ban those on pretty much any grounds, science and evidence having been chucked out the window along with rational thought. This is the right of countries to restrict or prohibit the sale and use of EU-approved GMO food or feed.

There are two key issues; firstly that European agriculture is hugely dependent on protein supplies from GM sources and secondly, you are effectively breaking up the European freedom of trade, which is the foundation upon which the European Union was created.

The first issue interests me most, as it highlights how little people understand about the global and complex nature of the food and feed chain and how much biotech drives food and feed production globally. Agriculture is fiercely cost-driven. Why do you think farmers spend half their time lamenting in Brussels? Big players in the food and feed chain are ruthless and the difference between earning enough to live and going bust is a cent on a litre of milk. To create your agricultural products, you need to be as competitive as possible and where animals are involved, this means buying in high quality feed at the lowest possible price. Europe does not pro-



CLAIRE SKENTELBERY
Secretary General of the European Biotechnology Network

duce enough protein to deliver its animal feed, and global production is dominated by GMOs. They allow cheaper and more efficient production of protein, so even if Europe did grow its own, it couldn't outcompete the GM-derived feeds on price because it starts from a more expensive production system.

Agricultural economists (and supermarkets) know what would happen to national production if a country could not use imported GM-derived animal feeds, cost of production would rocket and supermarkets would simply buy from the abundant supply of cheaper producers elsewhere. The public generally likes to buy cheap and the supermarkets will make sure they have plenty of that, whether your milk, cheese and pork (plus ingredients in any processed food) is from down the road or from China.

The Parliament overwhelmingly rejected the proposal based on the fact that it is almost unworkable from an implementation perspective and undermines European free trade, rather than for the catastrophic effect that it would have on any country fool enough to actually ban GM products, but we should take the result with a sigh of relief whatever the reason. It might look like a rural idyll as you watch cows grazing contentedly in the middle distance but it is a small window into an intensive global industry reliant on biotechnology-derived products and one that will happily buy its products elsewhere if the price is right. ■



Biobased fuel spurs high-flying hopes

SUSTAINABLE ECONOMY To meet self-imposed goals on the future reduction of CO₂ emissions, the aviation industry is completely dependent on a manufacturing scheme that allows it to integrate biobased jet fuels. Although a few different fuel types – to great fanfare – have already reached the market, setting up a thriving and seamless value chain is being throttled by low prices for fossil fuels.

Fields like cement production have found themselves unexpectedly sucked into the climate change debate, even though emissions output is tangential to their core business. But no one had to drag air transport giants into the limelight. The entire sector began making commitments to binding greenhouse-gas reduction goals as early as 2009. This summer, International Air Transport Association (IATA) Director General Tony Tyler emphasised that airlines had so far spent nearly a trillion dollars to update fleets with new, energy-efficient aircraft. The goals are ambitious. In global terms, the aviation sector claims it wants to achieve CO₂-neutral growth from 2020 onwards, and says that by 2050, its net carbon dioxide emissions will actually drop by 50% compared to 2005. Along with technological developments and gains in efficiency, the use of renewable fuels is an essential element of living up to those promises (see Fig. 1).

“Looking at the ways in which airlines can minimise CO₂ output, particularly within an environment where they are already seeking to reduce fuel burn, the options are limited,” says Peter Hind, Managing Director at British consultants RDC Aviation. Because the European fleet is young by global standards, one obvious pathway – replacing aging equipment with more modern planes – is not really an option. Operational enhancements aimed at reducing fuel burn, among them Continuous Descent Ap-

proach (CDA) and a Single European Sky Initiative, could at most achieve a 10% reduction in the current emissions inventory. That won't be enough to satisfy policymakers. “So the only medium-term solution to the CO₂ conundrum appears to be emitting less CO₂ from the fuel that we burn, rather than burning less fuel,” says Hind. This daunting prospect can only be achieved through the introduction of low or non-carbon biofuels.

The best things come in threes – like F-T, HEFA and SIP

To be used as jet fuel by any commercial carrier in the world, biobased fuel first has to meet certain industrial standards. The specification relevant for biobased kerosene in Europe is DEF STAN 91-91, which

for alternative fuels mirrors the American Society for Testing and Materials (ASTM) approval process. It's based on the High Biofuel Blends in Aviation (HBBA) study carried out by Lufthansa and the Bundeswehr Research Institute for Materials, Fuels and Lubricants (WIWeB). ASTM D1655 (“Standard Specification for Aviation Turbine Fuels”) covers kerosene in general, whereas ASTM D7566 (“Standard Specification for Aviation Turbine Fuel Containing Synthesised Hydrocarbons”) specifically covers alternative fuels and blends with conventional kerosene. So far, just three different types of biobased kerosene have received full certification under ASTM D7566: FT, HEFA ...

» Read the full story in the printed issue.

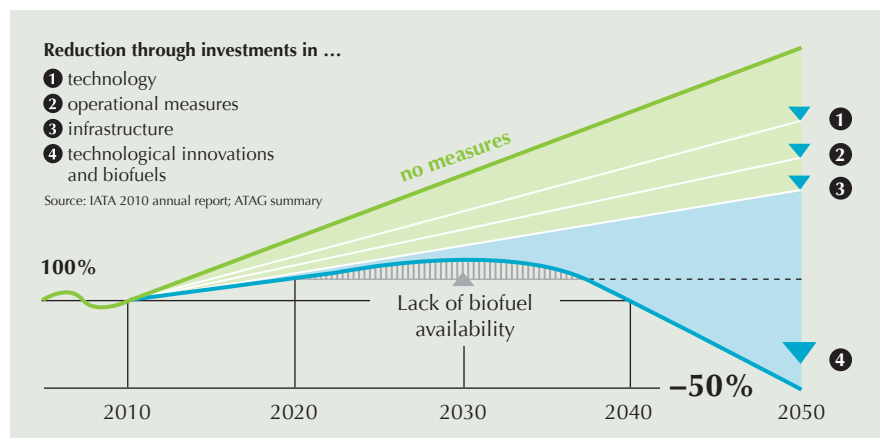
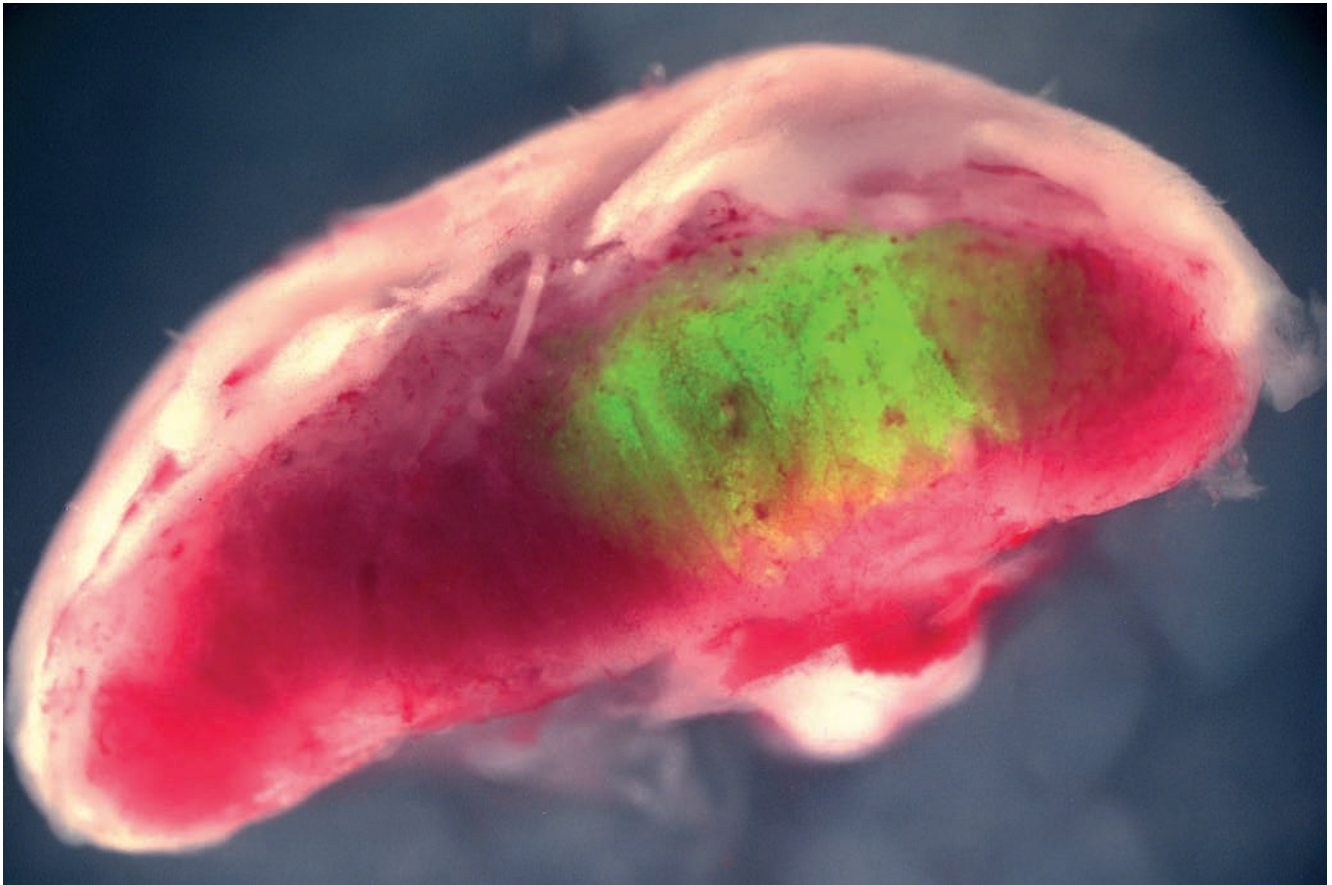


Fig. 1: The aviation sector says it can be CO₂-neutral from 2020 forward and cut net carbon dioxide emissions in half by 2050.

FREE EXCERPT



The next Big Thing – stem cell screening

STEM CELLS It's been less than a decade since Nobel laureate Shinya Yamanaka first reprogrammed human cells to return to an embryonic state. Now the first drugs based on human-cell models derived from induced pluripotent stem cells (iPSCs) are entering the clinic. Every major Big Pharma player has begun to create patient-specific cell models. It's a field with a lot of promise. Models that more accurately mimic human physiology are set to provide proof of safety and efficacy at the earliest stages of development – and that could in turn prevent costly clinical failures.

>> Read the full story in the printed issue.

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The potential and pitfalls of openness

INNOVATION Most life sciences firms pursuing R&D have tried at some point to slip sideways out of the traditional pathways of closed, internal product development. For about ten years, companies have been applying open innovation concepts – originating mainly in the IT sector – to identify and occupy new markets. However, most of these are little more than old wine in new bottles. This issue, EUROBIOTECH decided to take a snapshot of European Big Pharma and its most recent innovation strategies.

>> Read the full story in the printed issue.

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