

Trends in **AMERICAN + EUROPEAN** Press Coverage of Synthetic Biology

TRACKING THE YEARS 2008–2011



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Trends in

AMERICAN + EUROPEAN
Press Coverage of Synthetic Biology

TRACKING THE YEARS 2008–2011

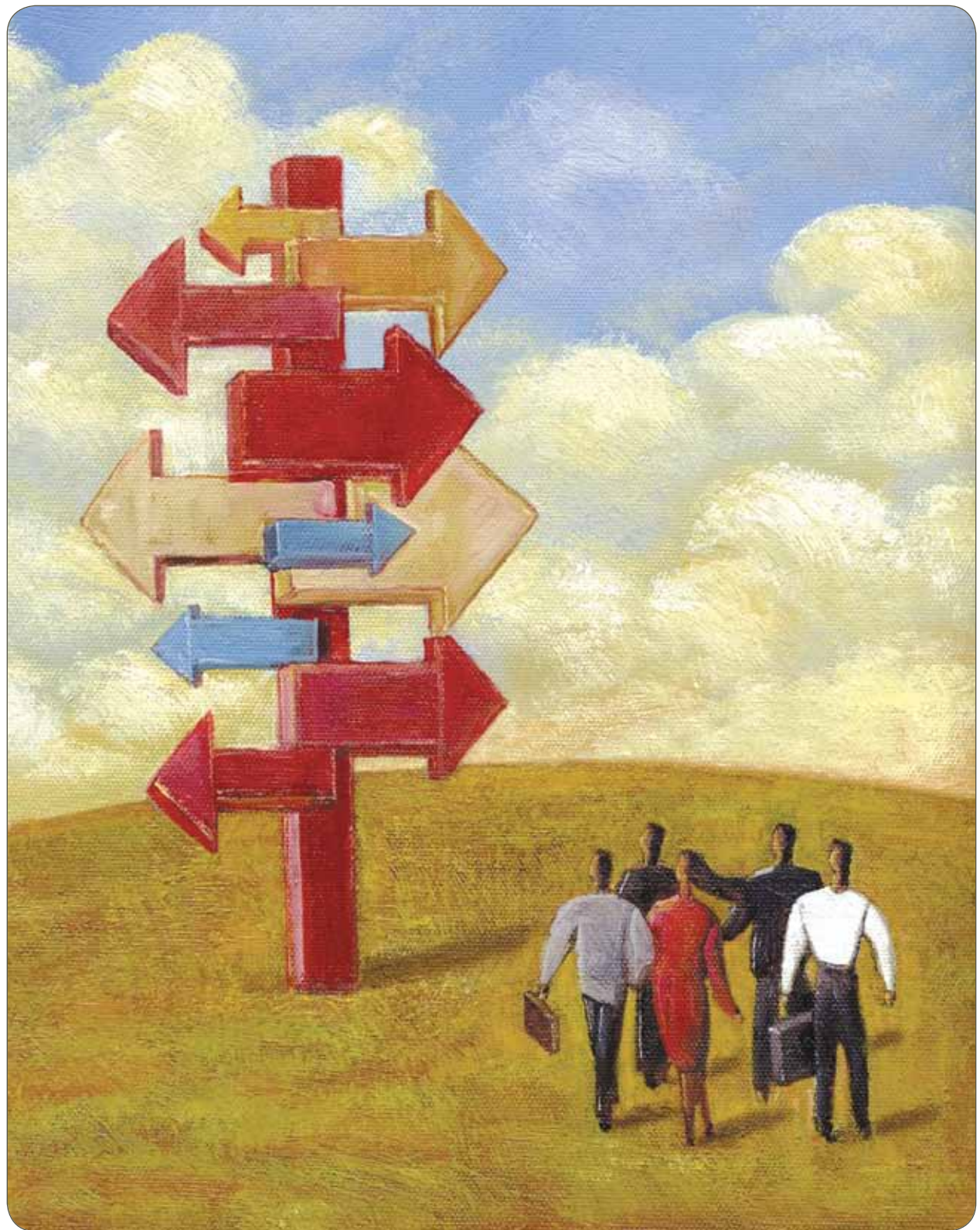
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SYNBIO 4 / DECEMBER 2012

“Despite its promise, synthetic biology is unnerving to those who doubt that scientists can keep their inventions from escaping their labs and wreaking havoc and who wonder whether regulators can keep the field’s powerful potential out of the hands of terrorists.”

—THE WASHINGTON POST, OCTOBER 23, 2009



Executive Summary

Synthetic biology burst onto the mainstream in the period between 2008 and 2011, with scientists announcing major research breakthroughs and governments considering whether regulatory and oversight frameworks for the emerging technology are sufficient. Press coverage of the issue has also increased during this period, and our research shows a number of trends starting to emerge.

COVERAGE HAS INCREASED

Driven by key announcements and events, press coverage of synthetic biology in the 2008–2011 period has tripled in the United States and increased steadily in Europe compared with the 2003–2008 period.

Coverage in the United States increased from 88 stories between 2003 and 2008 to 233 stories between 2008 and 2011. *The New York Times*, for example, published 10 articles mentioning synthetic biology in the 2003–2008 period, compared with 23 in the 2008–2011 period. In the European Union, there were 112 news stories in the 2003-

2008 period, compared with 729 news stories in 2008–2011 period. Coverage in French newspaper *Le Monde* has tripled in the latter period, while coverage in the Germany-based *Frankfurter Allgemeine Zeitung* has quadrupled in the same time period.

COVERAGE REMAINS EVENT DRIVEN

Major announcements of new discoveries in the field drove press coverage of synthetic biology. In January 2008, high-profile entrepreneur Craig Venter announced the creation of the first self-replicating bacterial cell. Both discoveries resulted in tremendous press coverage in the United States and Europe. The same day as the May 2010 announcement, President Obama asked his Presidential Commission for the Study of Bioethical Issues to look at the implications of the Venter announcement; the Commission delivered their findings in December 2010. While press coverage was driven primarily by the scientific announcements, the findings of the Commission also boosted coverage.

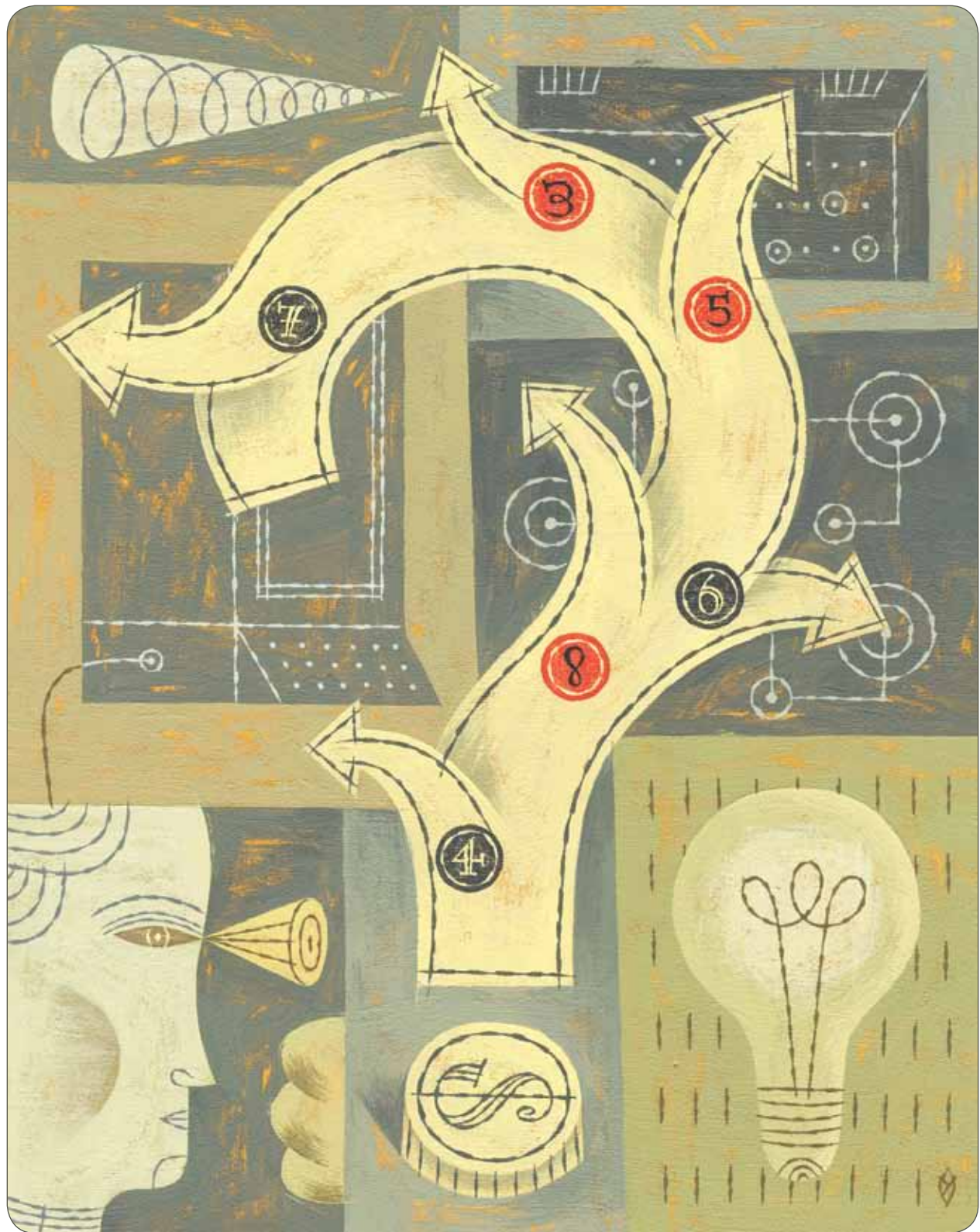
COVERAGE HAS BECOME MORE BALANCED

Coverage in the United States and Europe focuses largely on applications related to energy, a promising front for early innovation based on synthetic biology. Press coverage in the United States has also become more balanced in terms of discussing both the benefits and risks of the technology; in the 2003–2008 period, American coverage focused more on the benefits of synthetic biology than the risks. Coverage in the United States is now very similar to Europe in terms of how risks and benefits are addressed.

There is increased similarity in the types of concerns that were covered in the United States and Europe during the 2008-2011 period. Ethics garners the most coverage in Europe, followed by biosafety and biosecurity. In the United States, biosafety is the top concern; in the 2003–2008 period, the top concern was biosecurity.

“The dream is to make breakthroughs that will ultimately benefit humanity, in fields as diverse as biofuel and cancer research. The risk is putting dangerous materials into the wrong hands, which could lead to the creation of potent new pathogens or the reassembly of lethal old ones such as the 1918 influenza virus.”

—SAN FRANCISCO CHRONICLE, DECEMBER 20, 2009



Question 1:

Was there substantial press coverage of synthetic biology?

Analysis of both the American and the European press found significant coverage of synthetic biology on both sides of the Atlantic between January 2008 and December 2011, with the number of articles increasing substantially over the period from January 2003 to January 2008. Major newspapers in the United States and Europe, including *The New York Times*, *The Observer* in London and France's *Le Monde*, featured multiple stories and editorials on synthetic biology. In the United States, some regional newspapers also covered the issue, particularly in technology hubs like Silicon Valley in California and the Route 128 Corridor near Boston.



RANKING OF AMERICAN AND EUROPEAN NEWSPAPERS ON SYNTHETIC BIOLOGY BY NUMBER OF ARTICLES, FROM JAN. 2008–DEC. 2011

United States

<i>The New York Times</i>	23
<i>The Boston Globe</i>	14
<i>San Jose Mercury News</i>	14
<i>The San Diego Union-Tribune</i>	10
<i>San Francisco Chronicle</i>	10
<i>The Washington Post</i>	7
<i>San Francisco Business Times</i>	6
<i>USA Today</i>	6
<i>Contra Costa Times</i>	6
<i>Los Angeles Times</i>	5
Other	132

Germany

<i>Suddeutsche Zeitung</i>	36
<i>Frankfurter Allgemeine Zeitung</i>	20
<i>Der Standard</i>	19
<i>Der Tagesspiegel</i>	17
<i>Hamburger Adenblatt</i>	16
<i>Die Zeit</i>	13
<i>Die Welt</i>	10
<i>Aachener Nachrichten</i>	9
<i>Die Presse</i>	8
<i>Aachener Nachrichten</i>	7
Other	106

The Netherlands

<i>NRC handelsblad</i>	12
<i>Dagblad van het Noorden</i>	12
Other	43

United Kingdom

<i>The Observer (London)</i>	14
<i>The Times Higher Education Supplement</i>	14
<i>The Guardian (London)</i>	10
<i>The Scotsman</i>	6
<i>The Daily Telegraph</i>	5
<i>The Independent (London)</i>	5
<i>The Herald (Glasgow)</i>	4
Other	67

Italy

<i>Corriere della Sera</i>	19
<i>La Nazione</i>	12
<i>La Stampa</i>	9
<i>Il Resto del Carlino</i>	7
Other	5

France

<i>Les Echos</i>	36
<i>Le Monde</i>	24
<i>Le Figaro Economie</i>	13
<i>La Tribune</i>	13
<i>La Croix</i>	12
<i>Le Figaro</i>	11
Other	29

Spain

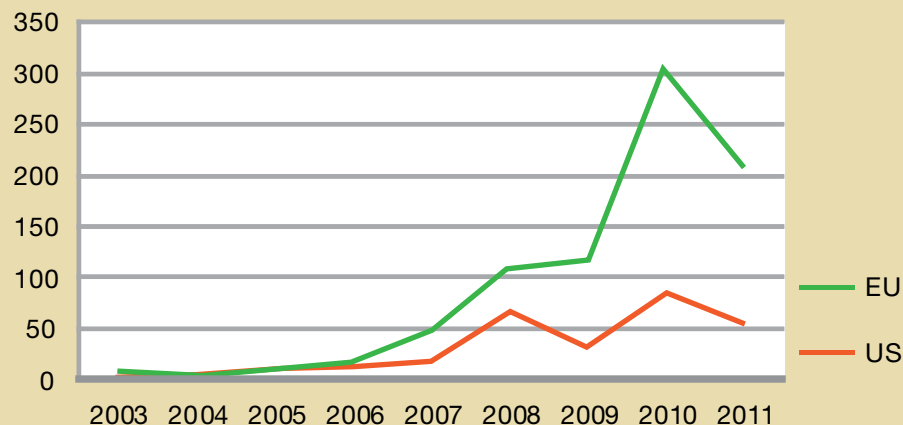
<i>ABC</i>	22
<i>El Pais</i>	12
<i>La Verdad</i>	11
<i>Diario Montanes</i>	6
<i>El Periodico de Catalunya</i>	5
Other	30

AMERICAN AND EUROPEAN PRESS REPORTING

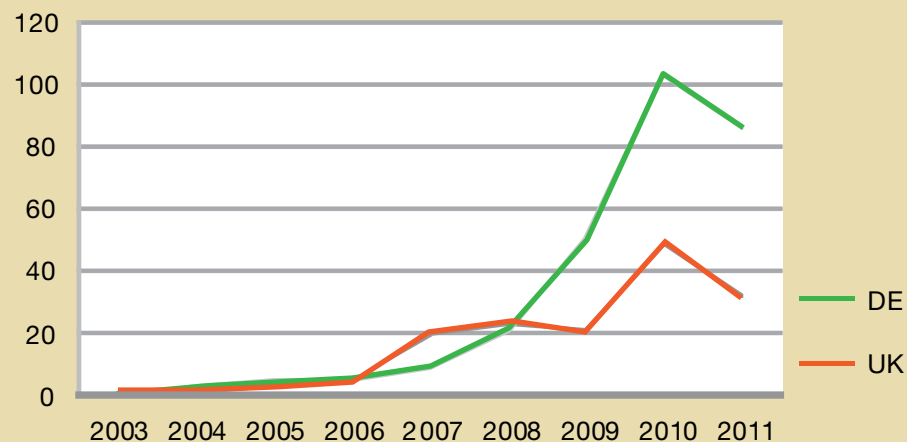
Coverage in the American and European press increased substantially in the 2008–2011 period compared with the 2003–2008 period. There were significant upticks in coverage in January 2008 and May 2010 driven by technological advancements announced by Craig Venter, as well as upticks in May and December 2010 driven by the work of the Presidential Commission for the Study of Bioethical Issues.

The press in the United Kingdom and Germany are significant contributors to overall press coverage of synthetic biology in Europe. Coverage in the United Kingdom follows a similar pattern to the coverage in the United States, with upticks around the 2008 announcements. German coverage, meanwhile, shows an impressive peak in 2010, remaining high into 2011.

NUMBER OF AMERICAN AND EUROPEAN NEWS STORIES PER YEAR (2003–2011)



NUMBER OF UK AND GERMAN NEWS STORIES PER YEAR (2003–2011)



“This is a tour de force and a landmark paper... that is akin to Jurassic Park or Frankenstein,” said Dr. Anthony C. Forster, a molecular biologist at Vanderbilt University who is an expert in the field of artificial life forms. “I think it will probably be regarded as the dawn of synthetic genomics.”

—LOS ANGELES TIMES, MAY 21, 2010

REASONS FOR COVERAGE

Three major events kept synthetic biology in the headlines between 2008 and 2011. Two announcements about scientific breakthroughs by scientist Craig Venter drove coverage in January 2008 and May 2010. These discoveries were quickly followed in 2010 with a report on synthetic biology requested by President Obama, which drove coverage at the time of the second Venter announcement and when the report was released in December 2010.

In January 2008, a team of researchers at the J. Craig Venter Institute announced that they had created the largest human-made DNA structure, the second of three steps in the creation of a fully synthetic cell. The work, which was published Jan. 24, 2008 in the journal *Science*, drew press coverage around the world. The *Los Angeles Times* heralded the announcement with the headline, “Moving a step closer to creating life,” while German newspaper *die Tageszeitung* referred to the discovery as “(n)äive fantasies of omnipotence.” But while the announcement was covered widely in Europe, there was more American coverage of the discovery.

In May 2010, researchers at the Venter Institute completed the third and final step in their move towards synthesizing life when

they announced that they had created the first self-replicating, synthetic bacterial cell, *Mycoplasma mycoides* JCVI-syn1.0. By this time, the announcement saw similar levels of coverage in both the United States and Europe. Researchers said the announcement was sought-after proof that genomes can be designed using a computer, made in the laboratory and then transplanted into a cell to create a new organism controlled by the synthetic genome. The tag clouds on the next page provide a distillation of how news outlets in the United States, United Kingdom and Germany covered the announcement.

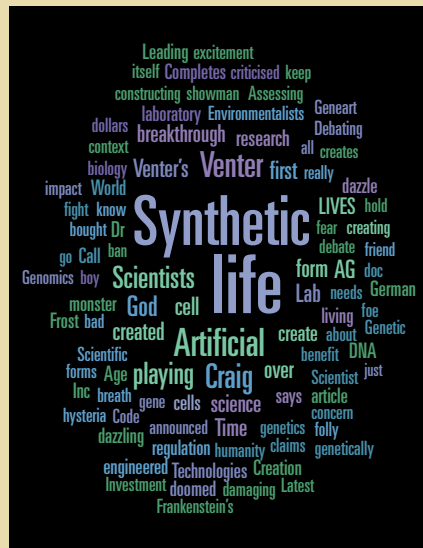
The same day as the May 2010 Venter announcement, President Obama called on his Presidential Commission for the Study of Bioethical Issues to study the implication of the discovery and offer recommendations for oversight and regulation of synthetic biology. The Commission released its report in December 2010 after a number of public meetings, urging continuing oversight but not calling for regulation at the time. *The New York Times* saw this as a “green light” for synthetic biology, while the *Los Angeles Times* saw it as calling for a “slow approach” to future work. “Keep on tinkering,” said Germany’s *Süddeutsche Zeitung*.

MEDIA COVERAGE OF THE MAY 2010 JC VENTER INSTITUTE ANNOUNCEMENT

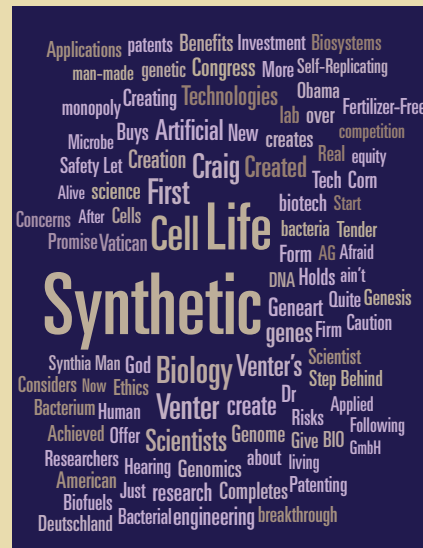
On May 20, 2010 the JC Venter Institute published a research article in *Science*, “Creation of a Bacterial Cell Controlled by a Chemically Synthesized Genome,” which detailed the development of the first self-replicating, synthetic bacterial cell. The breakthrough announcement led to an uptick in press coverage of synthetic biology around the globe.

HEADLINES IN THE POPULAR MEDIA BETWEEN MAY 20 AND JUNE 13, 2010 EMPHASIZE “SYNTHETIC LIFE”

UNITED KINGDOM



UNITED STATES



GERMANY



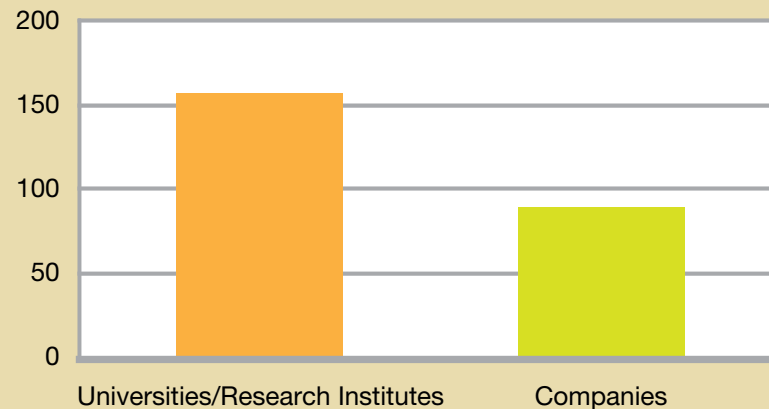
Question 2:

Who does the press mention in relation to synthetic biology?

Most press coverage in the United States focuses on the synthetic biology research being done in universities and research centers, including Stanford University, Harvard University, the Massachusetts Institute of Technology and the J. Craig Venter Institute.

But commercial activity is also starting to receive significant attention in the American press, including the work of companies like Solazyme, Amyris, Sapphire, Ziopharm and Intrexon. Applications are varied and include chemicals, like isobutanol, surfactants and squalane; yeast for processing animal feed; and cancer therapies.

NUMBER OF AMERICAN NEWS STORIES ABOUT SYNTHETIC BIOLOGY MENTIONING UNIVERSITIES/RESEARCH INSTITUTES AND/OR COMPANIES (JAN. 2008–DEC. 2011)



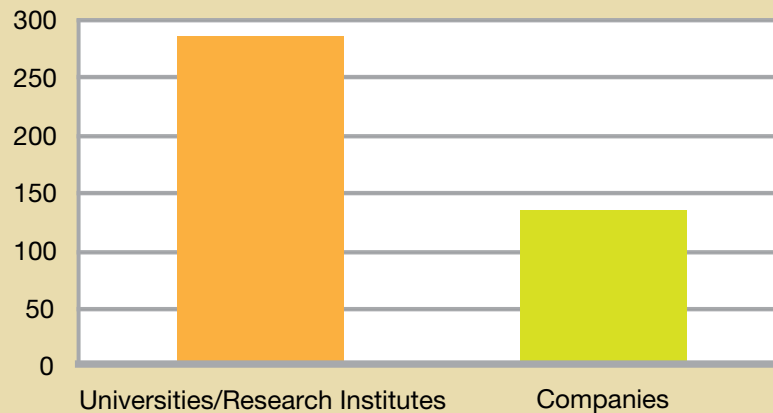
“Most synthetic biologists, however, are doing something a little less Frankenstein-sounding than that. They are plucking genes from plants, bacteria, insects and more to make cellular factories that produce fuels and other chemicals such as pigments, fragrances and drugs.”

—LOS ANGELES TIMES, AUGUST 5, 2010

Most European coverage is still largely focused on research in universities, like Imperial College, Edinburgh University, Heidelberg University, Oxford University, Technical University Munich and the German “Bio-Valley” centered around Freiburg, Basel and Strasburg. There is also significant coverage of American research breakthroughs.

Coverage of companies has increased slightly in Europe, but lags behind coverage of universities. Companies garnering coverage include Synthetic Genomics, Solazyme, Amyris, LS9, Sapphire, Geneart, ITI Life Sciences, Gevo and Codexis.

NUMBER OF EUROPEAN NEWS STORIES ABOUT SYNTHETIC BIOLOGY MENTIONING UNIVERSITIES/RESEARCH INSTITUTES AND/OR COMPANIES (JAN. 2008–DEC. 2011)



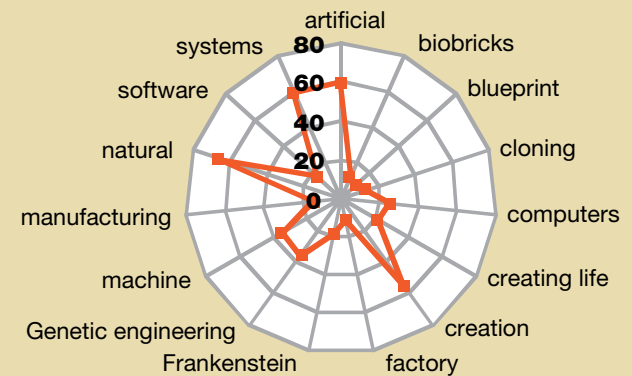
Question 3:

What does the press cover about synthetic biology?

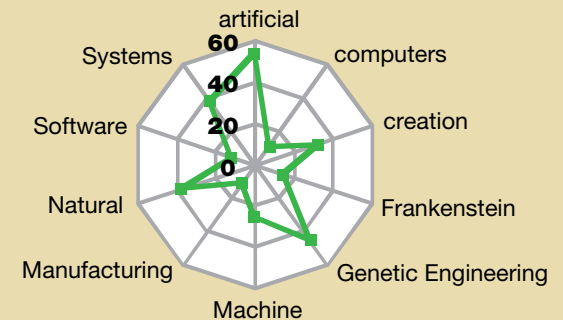
Framing words give some indication of how the press coverage addressed synthetic biology, and there were striking similarities between the most-used words in coverage in the United States, France, United Kingdom and Germany. For example, the most-used framing words in the American coverage were: natural, artificial, systems, creation and machine. The words “artificial” and “natural” were frequently used as the technology raises questions about the relationship between non-living machines and living organisms.

In the UK press coverage, the most-used framing words were: artificial, natural, systems, genetic engineering, creation and machine.

NUMBER OF AMERICAN NEWS STORIES ABOUT SYNTHETIC BIOLOGY MENTIONING SPECIFIC FRAMING KEY WORDS (JAN. 2008–DEC. 2011)



NUMBER OF UK NEWS STORIES ABOUT SYNTHETIC BIOLOGY MENTIONING SPECIFIC FRAMING KEY WORDS (JAN. 2008–DEC. 2011)

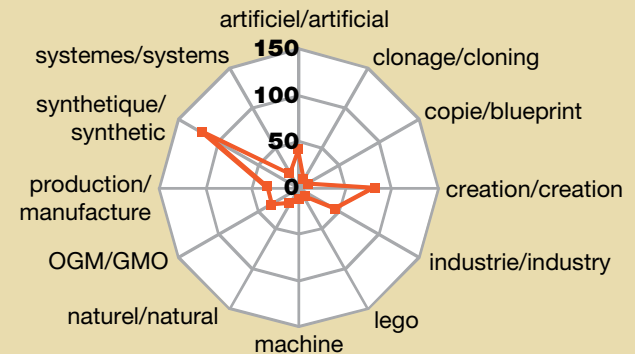


Meanwhile, the most-used framing words in the French press coverage were synthétique, creation, artificiel, industrie, production and OGMs (GMOs).

In the German press coverage, the most-used framing words were: Gentechnik (genetic engineering), herstellung (production), kunstlich (artificial), information and program.

Coverage in the United Kingdom and Germany included more references to genetic engineering than coverage in the United States and France.

NUMBER OF FRENCH NEWS STORIES ABOUT SYNTHETIC BIOLOGY MENTIONING SPECIFIC FRAMING KEY WORDS (JAN. 2008–DEC. 2011)



NUMBER OF GERMAN NEWS STORIES ABOUT SYNTHETIC BIOLOGY MENTIONING SPECIFIC FRAMING KEY WORDS (JAN. 2008–DEC. 2011)

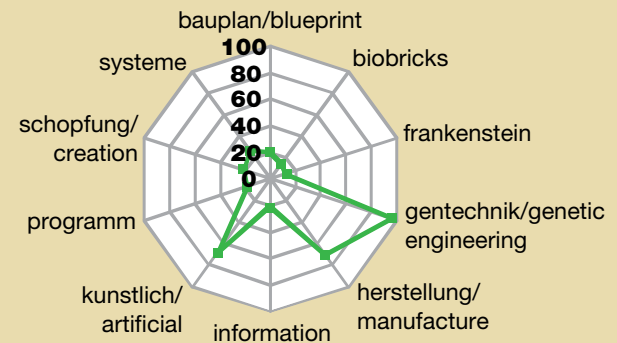
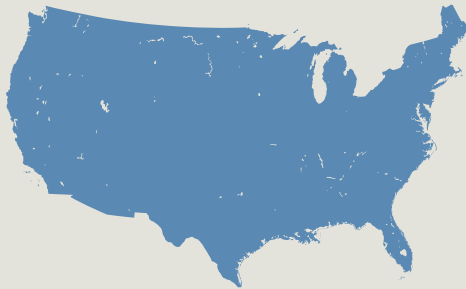


ILLUSTRATION OF THE FRAMING OF SYNTHETIC BIOLOGY— HEADLINES FROM DIFFERENT NATIONAL NEWSPAPERS

UNITED STATES



Crying wolf over bioterror; The threat posed by synthetic bugs is microscopic. So why are U.S. officials making such a big deal? (*Los Angeles Times*, March 2, 2008)

Finally, something good about E. coli; Scientist makes Vitamin A from it. (*The Philadelphia Inquirer*, May 28, 2009)

Is Craig Venter going to save the planet? Or, is this more hype from one of America's most controversial scientists? (*The Washington Post*, Aug. 11, 2011)

His Corporate Strategy: The Scientific Method (*The New York Times*, Sept. 5, 2010)

Merely Human? So Yesterday (*The New York Times*, June 13, 2010)

With computer-assembled DNA, the cell does as told (*The Oregonian*, May 24, 2010)

UNITED KINGDOM



Playing God is good for the planet (*The Daily Telegraph* (London), July 12, 2011)

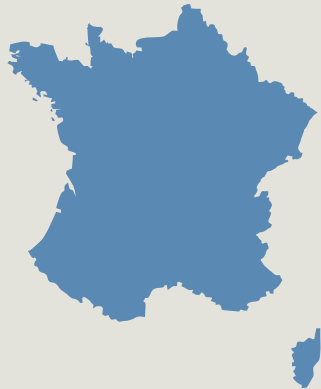
Between the Lines: 'Synthetic life' news is scary—for world-leading Scots rivals (*The Scotsman*, May 26, 2010)

Is this man playing God by trying to create artificial life? (*The Herald* (Glasgow), May 22, 2010)

Synthetic cell is a giant leap for science, and could be bigger still for mankind (*The Independent* (London), May 21, 2010)

Another Life Form? But Not As We Know It, (*The Journal* (Newcastle), Feb. 26, 2009)

FRANCE



“La vie artificielle est-elle pour demain?; La fabrication d’une bactérie dont le génome a été produit et assemblé par l’homme ouvre une ère nouvelle” – “Is artificial life for tomorrow? The manufacturing of a bacterium with a man-made genome opens a new era” (*Le Figaro*, June 5, 2010)

“Vertiges de la biologie synthétique” – “Dizziness from Synthetic Biology” (*Le Monde*, May 23, 2010)

“Le Retour de Frankenstein” – “Frankenstein is back” (*La Croix*, June 29, 2010)

“On a inventé la vie synthétique” – “Someone just invented synthetic life” (*Le Télégramme*, May 22, 2010)

“Création d’une cellule « synthétique »” – “Creation of a ‘synthetic’ cell” (*Le Monde*, May 22, 2010)

GERMANY



“Dürfen Wissenschaftler Gott spielen? Genforscher Craig Venter hat ein synthetisches Bakterium geschaffen—Streit um die Folgen” – “Should Scientists play God? Geneticist Craig Venter created a Synthetic Bacteria—Debate over the Consequences” (*Kölnische Rundschau*, June 12, 2010)

“Die Angst vor dem Amok der Mikroben; Verhaltenskodex und ethische Reflexe: Früh wie nie zuvor in der Gentechnik sind die Protagonisten der Synthetischen Biologie aktiv geworden” – “The fear of microbes run amok; Code of Conduct and ethical reflections: Activists engage earlier than ever before in genetic engineering” (*Frankfurter Allgemeine Zeitung*, May 21, 2010)

“‘Eine fremde Intelligenz’; Der Genetiker George Church träumt von geklonten Mammuts und der Wiederauferstehung des Neandertalers” – “‘A foreign intelligence’; The geneticist George Church dreams of cloned mammoths and the resurrection of the Neanderthals” (*Die ZEIT*, March 25, 2010)

“Killerviren aus dem Küchenlabor; Wie Biohacker in den USA versuchen, in Heimarbeit den Code des Lebens umzuprogrammieren” – “Deadly viruses from the kitchen lab, U.S. Biohackers try to reprogram the code of life” (*Süddeutsche Zeitung*, Nov. 10, 2009)

“Die lebende Fabrik; Wachs, Farben, Kunststoffe: Fast alles wird heute aus Erdöl und Erdgas hergestellt. Biologen wollen nun Zellen zu Fabriken machen” – “The living factory; Wax, paints, plastics: Virtually everything today is made from petroleum and natural gas. Biologists now want to turn cells into factories” (*Der Tagesspiegel*, Feb. 23, 2011)

Question 4:

Are there differences in how synthetic biology is covered in Europe versus the United States?

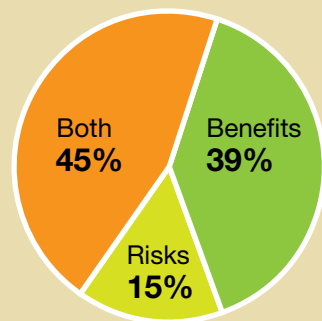
Our 2008 analysis¹ found a split between the United States and Europe on how the press covered the risks and benefits of synthetic biology. European coverage included a greater focus on the risks of the technology, emphasizing a more “precautionary” approach, while American coverage included a greater emphasis on the benefits, giving it an “optimistic” tone. This changed during the 2008–2011 period.

American coverage in the 2008–2011 period included a more balanced discussion of the risks and benefits, making it very similar in tone to the European coverage. Drivers for the greater focus on risks could be high-profile technological failures, like the 2010 oil spill in the Gulf of Mexico; greater coverage of synthetic biology in general; or more sophisticated discussion of scientific questions in the press.

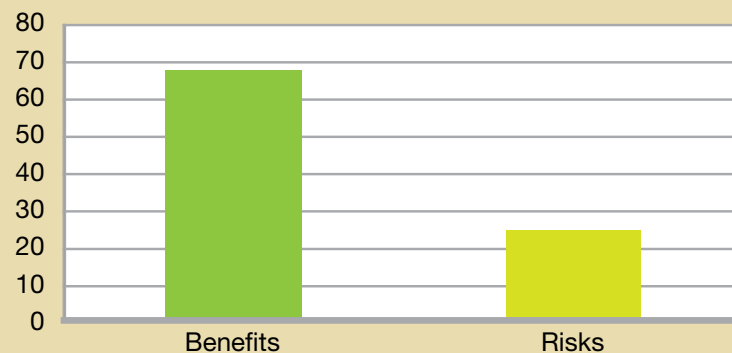
American press coverage still emphasized the benefits of synthetic biology but is less rosy than it was between 2003 and 2008. Around 30 articles appearing in the American press between 2008 and 2011 mentioned the risks of the new technology. Around 70 mentioned the benefits.

¹ <http://www.synbioproject.org/process/assets/files/5999/synbio1final.pdf>

PERCENTAGE OF AMERICAN NEWS STORIES MENTIONING POTENTIAL RISKS, POTENTIAL BENEFITS, OR BOTH (JAN. 2008–DEC. 2011)



NUMBER OF AMERICAN NEWS STORIES MENTIONING POTENTIAL RISKS OR BENEFITS (JAN. 2008–DEC. 2011)



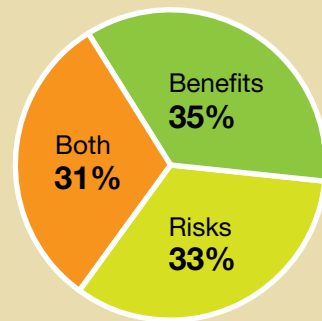
European coverage, meanwhile, has become more balanced in the 2008–2011 period. Some 35 percent of news articles during the period mention the benefits of synthetic biology, while 33 percent mentioned the risks and 31 mentioned both risks and benefits. In the 2003–2008 period, 51 percent of coverage only mentioned benefits, compared with 5 percent of coverage that mentioned only risks.

More than 120 articles appearing in the European press in the 2008–2011 period mentioned the benefits of the technology. About 117 articles also mentioned the risks of the technology.

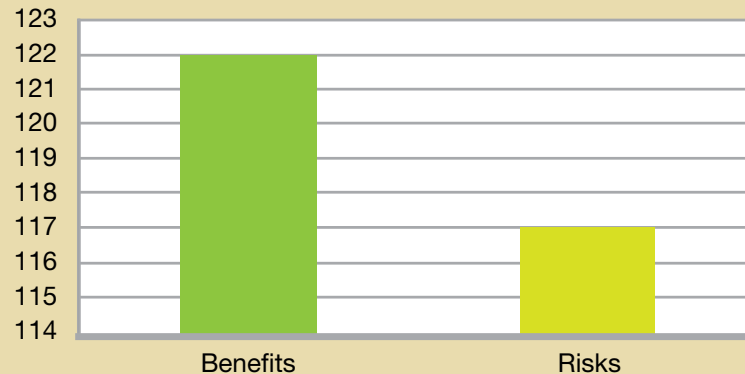
“The potential is huge—but so are the dangers. An artificial species, created in the lab, might not ‘obey the rules’ of the natural world—after all, every living being on Earth has evolved over 3 billion years, when a myriad of competing species have had to share the same increasingly crowded environment. It is possible to imagine a synthetic microbe going on the rampage, perhaps wiping out all the world’s crop plants or even humanity itself.”

—DAILY MAIL (LONDON), MAY 21, 2010

PERCENTAGE OF NEWS STORIES IN EUROPEAN PRESS THAT MENTION POTENTIAL RISKS, POTENTIAL BENEFITS, OR BOTH (JAN. 2008–DEC. 2011)



NUMBER OF EUROPEAN NEWS STORIES MENTIONING POTENTIAL RISKS OR BENEFITS (JAN. 2008–DEC. 2011)



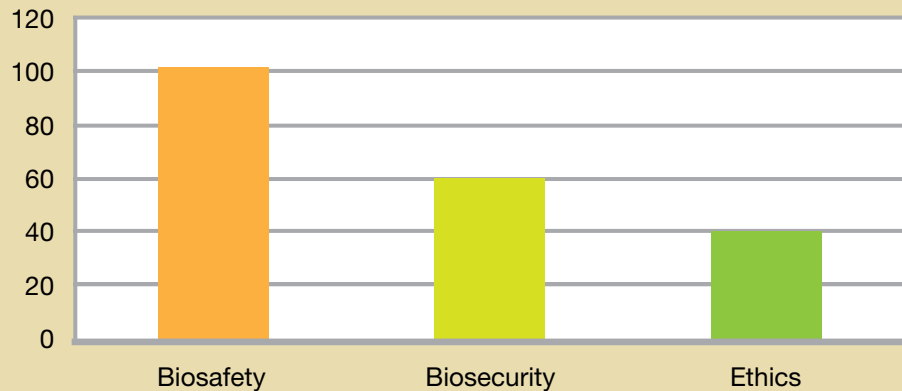
TYPES OF RISKS OF SYNTHETIC BIOLOGY

Still, there are significant discrepancies in how the press coverage in the United States and Europe addresses the risks of synthetic biology. The American coverage focuses largely on biosafety issues, with 102 articles in the 2008-2011 period, followed by biosecurity, with 61 articles. There were around 40 stories focused on ethics in the U.S. coverage.

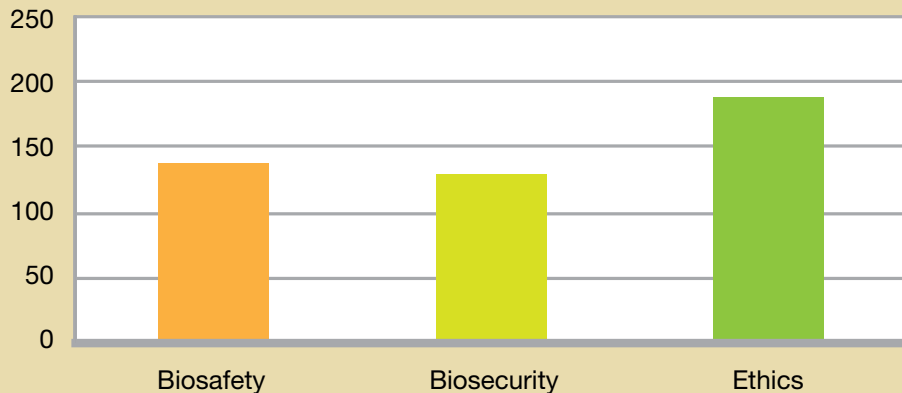
There was a significant change in European coverage: Ethics is now the top concern covered in the media, followed by biosafety and then biosecurity. Stories about ethical issues and the implications the new technology had for society seemed to be driving the increase in coverage.

The increase in European and American press coverage of ethics is not surprising as a number of meetings, reports and events addressed these issues in the 2008 to 2011 period. This includes a 2008 report from the Dutch Council on Genetic Modification; a 2009 report from the European Group on Ethics in Science and New Technologies; a 2009 report on the ethics of synthetic biology by the German Research Foundation DFG, the German Academy of Science and Engineering and the Leopoldina, Germany's national academy of science; the launch in 2009 of the Centre for Synthetic Biology and Innovation at Imperial College London, which is focused on ethics as well as science; and a 2010 report from the U.S. Presidential Commission for the Study of Bioethical Issues.

NUMBER OF AMERICAN NEWS STORIES MENTIONING A SPECIFIC TYPE OF POTENTIAL RISK/CONCERN (JAN. 2008–DEC. 2011)



NUMBER OF EUROPEAN NEWS STORIES MENTIONING A SPECIFIC TYPE OF POTENTIAL RISK/CONCERN (JAN. 2008–DEC. 2011)



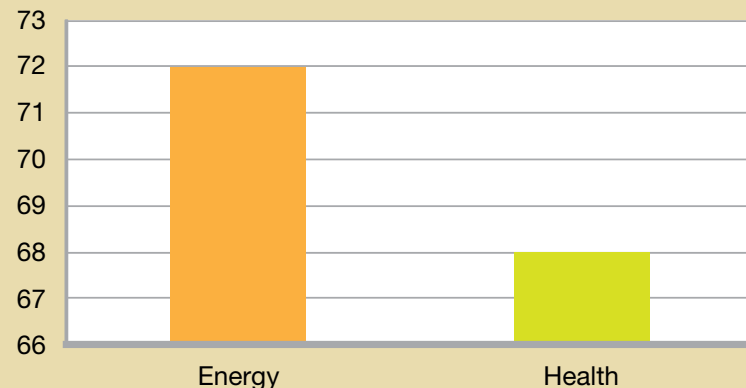
TYPES OF BENEFITS OF SYNTHETIC BIOLOGY

In both European and American press coverage, the benefits of synthetic biology are mentioned in quite generic terms, with energy benefits being the most-often cited in

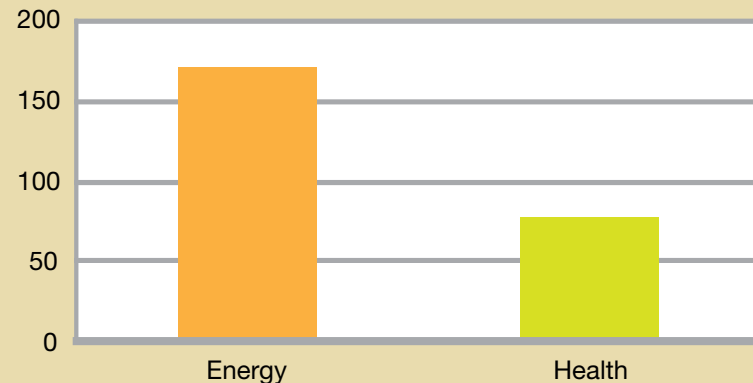
Europe and the United States. The focus on energy benefits could stem from interest in a number of biofuels products based around synthetic biology: Applications include bio-

based diesel alternatives, cellulosic biofuel ethanol, algal biofuels and algae-based bio-oil. In addition to energy benefits, health benefits are also mentioned.

NUMBER OF AMERICAN NEWS STORIES MENTIONING A TYPE OF POTENTIAL BENEFIT (JAN. 2008–DEC. 2011)



NUMBER OF EUROPEAN NEWS STORIES MENTIONING A TYPE OF POTENTIAL BENEFIT (JAN. 2008–DEC. 2011)



“Will synthetic biology be used to make more than fuels? As well as fuels, we are looking at everything else we produce from petroleum, including polymers and plastics, and asking: Can we go in and replace those? I don’t see any reason why we can’t make almost any chemical we want from sugar, a renewable resource. It’s a great time to be in biology and biotechnology, because we have so many more tools and it’s so much more powerful than it used to be.”

— THE OBSERVER (LONDON), FEBRUARY 27, 2011

Implications

The Press and Public Engagement

Tracking media coverage of synthetic biology is important because the public often understands complex scientific issues “less through direct experience or past education than through the filter of journalistic language and imagery.”¹ As the popular adage goes: The press does not tell the public how to think, but what to think about. Research has shown that journalists reporting on risks tend to focus on *events*, rather than *issues*.² Event-driven spikes in media coverage are often followed by a descent into what has been termed the “inert space of journalistic fatigue.” Drops in press attention reinforce a psychological mechanism people use in sorting information in a data-rich world known as the “availability heuristic,” where the magnitude and relevance of issues are based on the ease in which examples can be recalled.³ Once off the radar screen,

synthetic biology declines as a focus of public concern and is often replaced by the next big technology appearing in the headlines.

For this reason, the press can never be a substitute for public engagement. More effective public engagement efforts around synthetic biology are needed, especially as products based on the science begin to penetrate the marketplace.

A number of recommendations from recent reports emphasize this need:

PRESIDENTIAL COMMISSION FOR THE STUDY OF BIOETHICAL ISSUES (2010), RECOMMENDATION 14:

“Scientists, policymakers, and religious, secular, and civil society groups are encouraged to maintain an ongoing exchange regarding their views on synthetic biology and related emerging technologies, sharing their perspectives with the public and with policy makers. Scientists and policymakers in turn should respectfully take into account all perspectives relevant to synthetic biology.”

“‘We want a very early debate before the first products of synthetic biology come to the market. This technology is going to be very important and the technology must be explained in a way that the public can understand,’ said Brian Johnson, an independent consultant who chairs the public dialogue panel.”

—THE INDEPENDENT (LONDON), MAY 22, 2010

- 1 Nelkin, D. 1987. *Selling Science: How the Press Covers Science and Technology*, NY: Freeman.
- 2 Springer, E. & Endreny, P.M. 1994. “Reporting on Risk: How the Mass Media Portray Accidents, Diseases, Disasters and Other Hazards,” *Risk: Health, Safety and Environment*, Vol. 5, No. 3, pp. 262–270.
- 3 Volkes, V. 1988. “The Availability Heuristic and Perceived Risk,” *The Journal of Consumer Research*, Vol. 15, No. 1, pp. 13–23. Or: Tversky, Amos & Kahneman, Daniel 1973. “Availability: A Heuristic for Judging Frequency and Probability,” *Cognitive Psychology*, Vol. 5 (Sep.), pp. 207–232.



PRESIDENTIAL COMMISSION FOR THE STUDY OF BIOETHICAL ISSUES (2010), RECOMMENDATION 15:

“When discussing synthetic biology, individuals and deliberative forums should strive to employ clear and accurate language. The use of sensationalist buzzwords and phrases such as ‘creating life’ or ‘playing God’ may initially increase attention to the underlying science and its implications for society, but ultimately such words impede ongoing understanding of both the scientific and ethical issues at the core of public debates on these topics. To further promote public education and discourse, a mechanism should be created, ideally overseen by a private organization, to fact-check the variety of claims relevant to advances in synthetic biology.”

PRESIDENTIAL COMMISSION FOR THE STUDY OF BIOETHICAL ISSUES (2010), RECOMMENDATION 16:

“Educational activities related to synthetic biology should be expanded and directed to diverse populations of students at all levels, civil society organizations, communities, and other groups. These activities are most effective when encouraged and supported by various sources, not only government, but also private foundations and grassroots scientific and civic organizations. As part of the coordinated approach urged in Recommendation 4, the Executive Office of the President, with input from the scientific community, the public, and relevant private organizations, should identify and widely disseminate strategies to promote overall scientific and ethical literacy, particularly as related to synthetic biology, among all age groups.”

EUROPEAN GROUP ON ETHICS IN SCIENCE AND NEW TECHNOLOGIES (2009), RECOMMENDATION 21:

“The Group asks the EU and EU Member States to take actions to promote public debates and engagement amongst the stakeholders in order to identify main societal concerns in the different areas covered by synthetic biology.”

EUROPEAN GROUP ON ETHICS IN SCIENCE AND NEW TECHNOLOGIES (2009), RECOMMENDATION 22:

“The Group recommends that journalists, editors, including science editors, and other stakeholders promote responsible reporting on synthetic biology.”

EUROPEAN GROUP ON ETHICS IN SCIENCE AND NEW TECHNOLOGIES (2009), RECOMMENDATION 23:

“In order to promote a comprehensive approach to new technologies by the media the Group asks the Commission to stimulate specific actions, such as, inter alia, creating fora, seminars and courses addressing the implications of synthetic biology in the media.”

Methodology

The data in this report is based on a collection of articles retrieved by a LexisNexis search of daily newspaper articles on the term “synthetic biology” or its native language equivalent covering the period from January 2008 to December 2011. This search was conducted for each country involved in the study, and the exact search term used and articles returned can be found in the table at right.

These articles were then analyzed using QDA Miner¹ with WordStat to select and code paragraphs based on keywords found in the text. Data mining and visualization tool QDA Miner is used in social science research to retrieve, analyze and manage collections of qualitative data, such as news articles.

For this quantitative step, the original search queries returned 262 results for the United States and 876 results for Europe; however, some of these results were omitted from the dataset because they did not address the topic of synthetic biology in any detail or because they were duplicates of other articles, leaving 233 relevant news stories for the United States and 729 relevant news stories for Europe.

1 <http://provalisresearch.com/products/qualitative-data-analysis-software/>; <http://provalisresearch.com/products/content-analysis-software/>

Based on a set of specific keywords, a database was built using Microsoft Access containing each article, its date as listed by LexisNexis, the paper of publication, country of origin, and count of the appearances of keywords within each article. As a result, when computing certain sums, such as keyword mentions, the total sum of occurrences could be more than the number of individual articles. For example, an article might be associated with both the keyword “risk” and the keyword “benefit,” but the same article would only be counted once in the overall tabulation of all articles.

For a qualitative analysis, the articles that were flagged were then read for context by a team of researchers that included native speakers of the represented languages.

The database of articles was then used to generate the tables and charts used in this report. In the report, the classification “EU” refers to the collection of results from France, Germany, The Netherlands, Spain, Italy and the United Kingdom. Because each nation and newspaper approaches emerging technologies differently, there is no real unified European media. The study favors a qualitative approach and aims at giving a substantial sample of the European press coverage of synthetic biology.

COUNTRY	SEARCH TERM	ORIGINAL SEARCH QUERIES	RELEVANT NEWS STORIES
US	synthetic biology	262	233
UK	synthetic biology	128	125
FR	biologie synthétique, biologie de synthèse	242	138
DE	synthetische biologie	278	261
NL	synthetische biologie	84	67
ES	biología sintética	89	86
IT	biologia sintetica, biologia di sintesi	55	52

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The **Synthetic Biology Project** was established in August 2008 at the Woodrow Wilson International Center for Scholars. The Project aims to foster informed public and policy discourse concerning the advancement of synthetic biology—an emerging interdisciplinary field that uses advanced science and engineering to make or re-design living organisms, such as bacteria, so that they can carry out specific functions. Synthetic biology involves making new genetic code, also known as DNA, which does not already exist in nature.

Work of the Synthetic Biology Project is supported by a grant from the Alfred P. Sloan Foundation.

For more information about the Project visit: www.synbioproject.org

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