

# THE SO-CALLED SCIENTIFIC “CONSENSUS”:

## Why the Debate on GMO Safety Is Not Over



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**B**iotecology seed companies, aided by advocates from academia and the blogosphere, are using their substantial resources to broadcast the myth of a “scientific consensus” on the safety of genetically engineered crops (hereafter GMOs), asserting that the data is in and the debate is over. This public relations campaign, helped along by industry front groups, has caught the attention of some of the most visible news outlets in the country, with biotech advocates portraying GMO critics as akin to climate change deniers, out of step with science.<sup>1</sup>

However, unlike climate change, a subject on which climate scientists almost universally agree, there is no general agreement on GMO safety. And whereas the climate change debate refers to clear, succinct positions — whether the earth is warming and whether this is caused by human activity — the GMO safety debate encompasses dozens if not hundreds of safety questions related to environmental risks and human and animal health concerns. GMO advocates present the “consensus” as referring to a variety of vague themes, such as the “general safety and nutritional wholesomeness of GM [genetically modified] foods and feeds,” “crop biotechnology safety” or simply “safety,” making it totally unclear what aspect of safety the consensus covers.<sup>2</sup>

GMO safety is a far more complicated issue than the biotech industry presents, and most scientific bodies weighing in on the subject, including many cited by GMO advocates as part of the “consensus,” openly acknowledge unaddressed safety considerations and gaps in the existing body of safety

research. Yet the GMO-consensus campaign is misrepresenting the views of a variety of scientific organizations by cherry-picking and editing quotes, taking statements out of context and incorrectly attributing the opinions of individuals to scientific bodies that they do not represent.

As hundreds of independent scientists now come forward to condemn the GMO-consensus campaign — explicitly saying that there is “no consensus” on the safety of GMOs<sup>3</sup> — it’s time to knock down the three rotten pillars supporting the so-called “consensus.”

### 1. Scientific Institutions Do Not Support the So-Called “Consensus”

The biotech industry and its advocates and defenders frequently assert some variation of the claim that there is “a consensus opinion of all the major scientific bodies” on the safety of GMOs.<sup>4</sup> Biotech corporations and industry-friendly

academics, writers and front groups generally cite the same “scientific bodies,” using the same misleading quotes and talking points.<sup>5</sup>

The “scientific bodies” that purportedly are part of the “consensus” are few in number and are by no means representative of the entire scientific community. They have not signed on to a specific “consensus” statement nor have they, in most cases, actually developed policy positions on the subject. By and large, the GMO-consensus campaign has misquoted or misrepresented these scientific bodies to falsely assert that they are part of a “consensus” on GMO safety.

For example, the GMO-consensus campaign points to the Royal Society of Medicine and the Royal Society of London as part of the scientific “consensus,” based on quotes from individuals who are not formal representatives of these groups.<sup>6</sup> Neither organization has an official policy on GMO safety.<sup>7</sup>

Specifically, the GMO-consensus campaign asserts that the Royal Society of Medicine supports the “consensus” based on a single, cherry-picked quote from a review article that happened to be published in a journal run by the Society, but which does not reflect the official thinking or position of the organization.<sup>8</sup> This article no more represents the views of the Royal Society of Medicine than does the response letter that the journal published, which criticized the article for factual inaccuracy and a lack of supporting data.<sup>9</sup>

Meanwhile, the Royal Society of London is said to be part of the “consensus” based on excerpted text from a newspaper article about the Royal Society, not a quote or policy position from the Society itself.<sup>10</sup> Notably, this article actually focused on the Society’s decision to call for stricter safety testing of GMOs, asking for more detailed guidelines to assess whether genetically engineered crops may “lead to unpredicted harmful changes in the nutritional status of foods.”<sup>11</sup>

Biotech advocates cite the National Academies of Science (NAS) as part of the “consensus,” quoting the organization as saying, “To date more than 98 million acres of genetically modified crops have been grown worldwide. No evidence of human health problems associated with the ingestion of these crops or resulting products have been identified,”<sup>12</sup> but failing to add the rest of the quote, which dramatically changes the meaning: “but concerns have been raised about the potential for transgenic food products to cause allergic reactions or produce toxic compounds. In addition, concrete information on the effects of transgenic plants on the environment and on biological diversity is still sparse.”<sup>13</sup>

The NAS has no official position on the safety of GMOs and, in fact, initiated a new study of GMOs in 2014 to investigate, among other things, safety issues, clearly indicating that the debate on safety is not over.<sup>14</sup> The NAS has cited safety concerns with GMOs for many years, including potential unintended consequences associated with gene manipulation; the potential for genetic engineering techniques to raise “toxicities, allergies, nutrient deficiencies and imbalances”; negative effects on beneficial, non-target species; and the inadequacy of current regulatory safety reviews.<sup>15</sup> These concerns came

from reports that were produced at a time when biotech companies like Monsanto and DuPont and the Biotechnology Industry Organization, a trade association, sat on high-level National Research Council boards,<sup>16</sup> and their influence may have weakened the language and conclusions.

The NAS has also explicitly called for post-market surveillance and epidemiological studies,<sup>17</sup> which would be needed to document possible adverse health effects associated with certain GMOs. This recommendation echoes a call from the larger scientific community, which notes that there has never been an epidemiological study of adverse effects on human health, in part because GMOs are not labeled in places like North America, where many of the world’s GMOs are cultivated and consumed.<sup>18</sup>

Biotech advocates have also misrepresented the views of the World Health Organization (WHO) by using a partial quote similar to that of the NAS: “No effects on human health have been shown as a result of the consumption of GM foods by the general population in the countries where they have been approved.”<sup>19</sup> GMO activists cherry-picked this quote, however, omitting the preceding text: “Different GM organisms include different genes inserted in different ways. This means that individual GM foods and their safety should be assessed on a case-by-case basis and that *it is not possible to make general statements on the safety of all GM foods*” (emphasis added).<sup>20</sup>

Biotech advocates also point to the American Medical Association (AMA), offering a partial quote from an AMA council report — not official AMA policy — which was designed to address GMO labeling, not GMO safety.<sup>21</sup> The quote, like that of the NAS and the WHO, cites the lack of documented





adverse effects on human health from GMOs,<sup>22</sup> but, once again, GMO advocates chose to misrepresent the AMA council report's full statement, which acknowledges the potential for adverse effects and the need for mandatory, pre-market safety assessments.<sup>23</sup> The final, official AMA policy — adopted by the organization's governing body in 2012 — does not include the quote used by the GMO-consensus campaign, and it actually notes potential safety issues with GMOs and explicitly recommends ways to improve safety assessments, including the “development and validation of additional techniques for the detection and/or assessment of unintended effects.”<sup>24</sup>

The American Association for the Advancement of Science (AAAS) is cited as part of the “consensus” on GMO safety, but the facts are less clear. In 2012, the AAAS Board of Directors, at that time led by Nina Fedoroff, a leading GMO advocate who has significant ties to the biotechnology industry, issued a statement about GMO labeling, not GMO safety.<sup>25</sup> The statement appears to have been written with talking points from the GMO-consensus campaign, including erroneously stating that the AMA, the WHO, the NAS, the Royal Society “and every other respected organization that has examined the evidence” have “come to the same conclusion” that GMO food is as safe as non-GMO food.<sup>26</sup> Such a dubious statement grossly misrepresents the scientific community — and the views of many AAAS members, at least 20 of whom came forward to condemn the AAAS policy against GMO labeling.<sup>27</sup> The AAAS has never issued an official policy on GMO safety.<sup>28</sup>

Pro-GMO activists point to “seven of the world's academies of sciences” as part of the “consensus” based on a cherry-picked quote from a report that is nearly 15 years old.<sup>29</sup> That report, authored in part by the NAS and the Royal Society of London, does not state or conclude that GMOs are safe, and explicitly notes “the possibility of long-term adverse effects” on human health, the “virtual absence of data” on the risks

of GMO gene flow and that GMOs’ “actual effects on the environment and on biological diversity is still very sparse.”<sup>30</sup> The report explicitly noted that there was “no consensus” on environmental impacts of GMOs.<sup>31</sup>

The GMO-consensus campaign cites the European Commission (EC) as part of the “consensus” based on a single quote from a report that the EC issued, which was edited to make it appear more favorable: it was changed from saying that GMOs are “not *per se* more risky than e.g. conventional plant breeding technologies” to “...no more risky than...”<sup>32</sup> And, as many scientists have pointed out, this EC report was not a definitive review of GMO safety, looking only at five feeding studies on GMOs, for example — none of which presented conclusions about food safety.<sup>33</sup> In fact, much of the cited report is dedicated to describing Europe's communication strategies around GMOs and its research and development of GMOs for biofuels or biomaterials.<sup>34</sup>

A fair representation of the European continent's scientific sentiment toward GMOs would note the many science-based, national regulatory agencies that have, for nearly two decades, severely restricted or outright banned GMO cultivation in European countries, often citing safety concerns.<sup>35</sup> By contrast, the GMO-consensus campaign has cherry-picked the regulatory agencies of Australia and New Zealand as part of the “consensus.” While these agencies have asserted that approved GMO foods are just as safe as their conventional counterparts,<sup>36</sup> most of Australia currently has a GMO moratorium in place, and New Zealand cultivates no commercial GMO crops and requires labels of foods containing GMO ingredients.<sup>37</sup> If the GMO-consensus campaign wants to include national regulatory agencies in the GMO safety debate, then it should also note that many regulatory agencies around the world have restricted GMO cultivation and/or required labeling, often based on safety concerns,<sup>38</sup> and that the vast majority of nations do not grow GMOs commercially.<sup>39</sup>



The GMO-consensus campaign sometimes even points to obviously biased, industry-funded groups as evidence of the existence of a “consensus” — such as the Monsanto-sponsored Council on Agricultural Science and Technology and the Syngenta-funded American Council on Science and Health.<sup>40</sup> So zealous are promoters of the “consensus” that they will sometimes even try to assert that GMO critics are part of the “consensus.” In 2013, University of California biotechnologist Pamela Ronald, a prominent GMO advocate with substantial industry ties, authored a blog asserting that the Union of Concerned Scientists (UCS) agrees with much of the “scientific consensus.”<sup>41</sup> UCS, which is one of many scientific organizations that has noted safety issues with GMOs, immediately rebuked Ronald, stating that she had misrepresented their views and that she was not even in dialogue with the organization.<sup>42</sup>

## 2. The Scientific Literature Does Not Support the So-Called “Consensus”

Promoters of the “scientific consensus” also point to scientific literature as evidence that the debate is over. In 2012, the American Society of Plant Biologists — which is sponsored by biotech companies<sup>43</sup> whose representatives also hold leadership positions in the organization<sup>44</sup> — gave a grant to the GMO advocacy group Biology Fortified, Inc. (BioFortified) to create a database of scientific studies on GMOs, which purports to demonstrate their “general safety and nutritional wholesomeness.”<sup>45</sup>

However, a large, independent group of international scientists has sharply criticized the BioFortified project, noting that very few of the database’s studies actually address food safety or empirically study toxicity — and many of those that do actually show toxic effects.<sup>46</sup> Additionally, an independent, peer-reviewed study of GMOs published in 2011 found very limited food safety research and also noted that most safety studies showing GMOs to be safe came from biotechnology companies.<sup>47</sup> This finding echoes a variety of research showing that industry studies routinely produce results that are favorable to industry sponsors.<sup>48</sup>

Initially, BioFortified located and posted a list of 600 GMO studies, from which it identified 126 (about 20 percent) as being “independent,”<sup>49</sup> although even among these studies one could find industry influence, for example at least one Monsanto co-authored study.<sup>50</sup> In late August 2014, BioFortified released a trial version of a new database tool that it had designed containing 400 GMO studies, now claiming that half were “independent.”<sup>51</sup> However, biotech-authored studies remain labeled as independent,<sup>52</sup> and BioFortified considers biotech-funded non-profits like the American Society of Nutrition to be “independent.”<sup>53</sup> Additionally, more than 20 percent of the 400 studies do not disclose a funding source.<sup>54</sup>

Whether or not a study is independent is a crucial indication of potential bias, a pervasive issue in agricultural research, where corporate agribusinesses author and fund countless studies at the same time that they attack unfavorable research or restrict independent research.<sup>55</sup> In 2009, dozens of academic crop scientists formally complained to the U.S. Environmental Protection Agency that independent research was not possible on many critical questions because the industry exerts so much influence and power.<sup>56</sup> They did so anonymously, for fear of losing the industry funding on which their research is dependent, highlighting how much control the industry exerts, even in academia.<sup>57</sup>

Given the flawed design of BioFortified’s database, in which a pro-biotech advocacy group has made a highly subjective analysis of GMO research, this partisan tool cannot be used as a basis for determining the existence of a “consensus.” And given the dearth of independent safety research into GMOs and the strong presence of industry studies, the available scientific literature clearly does not point to a “consensus” on GMO safety.

## 3. Independent Scientists Do Not Support the So-Called “Consensus”

The third main pillar of evidence that biotech advocates cite as evidence of a “scientific consensus” comes from the stridently pro-GMO advocacy group AgBioWorld, whose co-founder and



vice president works for an organization that takes funding from Monsanto.<sup>58</sup> AgBioWorld promotes a list of 3,400 “scientists” who “believe” that genetic engineering is a “powerful and safe means for the modification of organisms.”<sup>59</sup>

The vast majority of the 3,400 names have been hidden from public view for at least one year.<sup>60</sup> Of the 250 names publicly available, nearly 30 percent are industry employees from companies like Monsanto, Pioneer Hi-Bred and Syngenta. Another 12 percent of the “scientist” signatories do not claim advanced degrees in the sciences, including one signatory who lists a bachelor’s degree in “Real Estate.” Of the remaining signatories, more than 10 percent do not list a professional affiliation or employer, making it difficult to tell if they work for the industry or not. Of those remaining scientists who do list an employer, some are not truly independent of the industry. Dale Bauman is listed as working for Cornell University, but he has done paid consulting work for Monsanto.<sup>61</sup> Ajith Anand is listed on AgBioWorld as being affiliated with Kansas State University, but he publishes research under an affiliation with the biotech company DuPont/Pioneer.<sup>62</sup>

## The “No-Consensus” Counter-Campaign

Frustrated with the misinformation campaign perpetrated by the biotech industry and its cheerleading bloggers and academics, a group of independent scientists began circulating their own statement that there is “no consensus” on the safety of GMOs.<sup>63</sup> As of publication of this document, close to 300 scientists — almost all of them holding advanced degrees in relevant fields — have signed this statement, which carefully outlines a litany of problems with the “consensus” and provides a scientific review of safety issues with GMOs.<sup>64</sup> These include:

- Limited animal feeding trials have been conducted on GMOs; several show or suggest toxic effects.<sup>65</sup>
- The biotechnology industry is responsible for most of the available feeding trials showing that genetically engi-

neered crops are safe and nutritious; an equal number of research groups working on feeding trials has expressed “serious concerns” over safety.<sup>66</sup>

- No epidemiological studies exist looking at human food safety.<sup>67</sup>
- There is evidence of environmental safety issues, including adverse, unintended impacts on non-target organisms and the promotion of resistant weeds.<sup>68</sup>
- There is evidence of possible adverse human and animal health effects from exposure to Roundup,<sup>69</sup> the herbicide used on the majority of GMO crops.<sup>70</sup>
- Several international agreements acknowledge safety issues with GMOs.<sup>71</sup>

## Conclusion

The fact that such a vigorous debate has emerged on whether a “consensus” exists on GMO safety is evidence enough that the issue is not settled. The real conversation that scientists and the public should be having — in academic journals, in the media and in Congress — is not whether a “consensus” exists, but whether or not GMOs are safe.

That GMO boosters are working so hard to distract the public from this meaningful conversation about GMOs is, unfortunately, par for the course. The biotech industry has long used its financial might and political power to distort the public discourse — and even the science — surrounding GMOs. There is now an extensive public record showing the ways in which biotech companies restrict independent research or attack scientists who publish unfavorable research — while also greatly rewarding and incentivizing favorable research with countless millions of dollars in research grants, endowments and consulting gigs.<sup>72</sup>

The biotech industry also employs neutral-sounding front groups, like the Center for Consumer Freedom, to advance its economic and political agenda.<sup>73</sup> To be sure, whether it’s a biotech giant like Monsanto, a Monsanto-aligned blogger or a Monsanto-allied academic, all corners of the GMO-consensus campaign are using the same misleading talking points and quotes to suggest that there is a “consensus.”

A critical first step toward resolving the many lingering safety questions surrounding GMOs will be independent safety research, including the projects that the scientific bodies mentioned above have suggested. In the meantime, all GMOs should be labeled so consumers can make clear choices (eg, thresholds for unapproved GMOs in feed should be repealed and should not be permitting in food). Among many other benefits, this will allow researchers to conduct the epidemiological studies needed to meaningfully assess whether GMOs may be having long-term health impacts on consumers, including via animal feed.

The European Union should halt all GMO food and crop approvals, and existing approvals should be suspended, until all of the safety questions are resolved.

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