All-Party Parliamentary Group on
Science and Technology in Agriculture

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Health and welfare benefits of gene editing in livestock highlighted at All-Party Group meeting

Precision breeding technologies such as genome editing (GE) can help accelerate the development of major health and welfare boosting traits such as PRRS resistance in pigs and bird flu resistance in poultry, as well as sexing applications to avoid the need to cull male chicks or dairy calves, a cross-party group of MPs and Lords has heard.

As the world emerges from a global pandemic, amid mounting concerns over food security, and with global demand for meat protein set to double by 2050, leading figures spanning the entire livestock research and production chain - from the veterinary, genetic science, breeding and farming sectors - told the All-Party Parliamentary Group on Science and Technology in Agriculture last month that it would be unethical not to embrace the potential of technologies such as gene editing to help improve sustainable, high-welfare production in farmed animals.

They were responding to the presentation of a December 2021 report on the social and ethical issues of gene editing in farmed animals by Pete Mills, Assistant Director at the Nuffield Council on Bioethics.

The Nuffield report characterised modern farming and food production as 'morally indefensible and unsustainable', and called for the research, breeding and rearing of genome edited livestock to be tightly regulated to prevent welfare abuses.

But Professor Lord Trees, a former President of the Royal College of Veterinary Surgeons, warned that excessive restriction of specific breeding technologies, such as genome editing, could be a major missed opportunity to deliver significant improvements in animal health and welfare, as well as the environmental impact of livestock production.

"Disease is the single biggest welfare issue in rearing farm animals, and genome editing offers the potential to accelerate the development of disease resistant breeds which would in turn reduce drug and chemical use with positive effects for problems such as anti-microbial resistance and environmental pollution. Other applications of GE include the potential to reduce greenhouse gas emissions and aid sex determination, with significant potential benefits for animal health, welfare and the environment," he said.

Professor Helen Sang, a researcher at the Roslin Institute who has pioneered the use of gene editing to develop bird flu resistance in chickens, also underlined the major opportunities of applying these technologies to benefit animal health and welfare, with UK research leading the world in many respects.

She cautioned against singling out genome editing for extra regulation on the grounds of perceived welfare concerns, which could equally apply to other practices such as conventional breeding, vaccination and treatment with drugs.

“Regulatory safeguards are already in place to maintain high standards of welfare – during early-stage research and on-farm – and as such this is not a GE-specific issue. Singling out genome editing for greater regulatory scrutiny would inevitably deter investment, delay innovation, and ultimately block the development of major health and welfare boosting traits such as PRRS resistance in pigs and bird flu resistance in poultry. This would obviously not be good news for UK-based research aimed at improving livestock health and welfare, preventing future zoonoses, reducing drug use, and mitigating climate change,” she said.

Livestock breeder Dr Craig Lewis, of Genus/PIC and chair of the European Forum of Farm Animal Breeders (EFFAB), emphasised the positive changes that have taken place in breeding programmes over the past 20 or so years, from targeting a limited number of production-related traits to now focusing on a much broader range of some 30 characteristics, many of which are directly related to animal health, welfare and sustainability. As such, the report’s portrayal of modern livestock breeding was out of date and inaccurate and, disappointingly, overlooked evidence presented to the report’s authors by the livestock breeding industry, he said.

“Speaking on behalf of a company which has successfully used gene editing to deliver effective resistance to the devastating PRRS virus in pigs, which impacts both intensive and extensive production systems, it could be viewed as unethical from a welfare and sustainability standpoint not to support the application of these more precise and accelerated breeding technologies in UK agriculture,” he said.

Rob Beckett of YorkWold PigPro, a livestock farmer with over 35 years’ experience in the industry, said the direction of travel for on-farm animal health and welfare in the UK is undeniably positive, with significant reductions in antibiotic use, stocking densities and surgical procedures. Much of this progress is due to breeding innovations, he said, driven by a collective approach involving consumers and retailers, processors, farmers, vets and genetics companies.

The two-thirds reduction in antibiotic use by the UK pig industry since 2014 can be attributed not only to better standards of management and husbandry, but also to development of more resilient and disease resistant breeding lines, he added.

“When such improvements are taking place, I do not identify with the Nuffield report’s description of modern farming as ‘morally indefensible and unsustainable’. It is frustrating that much of the report reflects the views of those with deep-seated prejudice against livestock farming *per se*, rather than focusing on the application of advanced breeding techniques with such enormous potential for good. The Covid pandemic should be a reminder of the need to embrace new knowledge and technology to protect human and animal health. UK-based scientists at places like Roslin and Pirbright are world leaders in gene editing research to improve livestock health and welfare and prevent future zoonoses. In my view it would be unethical to restrict or discourage such research due to out-of-date or ill-informed prejudice against the livestock sector,” he said.

Speaking after the meeting, Julian Sturdy MP, chair of the APPG on Science and Technology in Agriculture said:

“Based on the discussion, it is clear that subjecting genome editing to greater regulatory scrutiny on the grounds of perceived welfare concerns could actually be counter-productive by deterring or blocking the potential development of major health and welfare boosting traits in farmed animals. It also makes no sense from a law-making point of view because the welfare of farm animals is already subject to separate regulations.”

"I do wonder if more attention could or should have been devoted by the report to the socio-economic and ethical consequences and risks of NOT enabling and encouraging scientific research into these techniques, for example in terms of global food and nutrition security, improved prospects for subsistence farmers in developing countries without the infrastructure to access drugs or veterinary care, and the potential prevention of future zoonoses and pandemics. In this context, it must be emphasised that these same techniques have allowed the rapid and life-saving scientific response to the Covid-19 pandemic by developing effective vaccines in record time."

"One notable aspect to the report's publication is that some livestock breeders and scientists now recognise that they need to talk more openly about what modern livestock breeding programmes involve, how these new techniques will be and are being used, and how breeding objectives are balanced against welfare concerns. That can only be positive for the future application and acceptance of these technologies in agriculture and food production," he said.

ENDS

Notes to Editors:
A full note of the APPG meeting held on 26 April 2022 is available here

The All-Party Parliamentary Group on Science and Technology in Agriculture exists to promote debate among politicians and other stakeholders on the value and role of scientific innovation in UK agriculture. The Group works to ensure that the Government's support for agri-science is maintained and strengthened, that the regulatory environment is evidence-based and enabling, and that the contribution of modern agriculture to our society, economy and environment is valued and understood as widely as possible.

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