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Senator Caxton, Representative Meyer, and other honourable members of the Health and Human Services Committee, my name is Judy Sayers and I am a graduate student studying for a PhD in Chromosome and Developmental Biology at the University of Oxford. I am testifying regarding LD 1601 in order to provide a perspective from a junior bench scientist on a topic of global scientific importance.

CRISPR/Cas technologies have greatly facilitated my lab's ongoing research into mechanisms of heart regeneration and repair. We aim to understand how the heart responds to serious heart injury, such as a heart attack. Our research supports the design of regenerative therapies to prevent heart disease, which remains the foremost cause of death in the developed world. CRISPR/Cas is now a very important part of the toolkit available to geneticists and biomedical scientists in the laboratory used on a day-to-day basis, in wide-ranging research questions. This technological development has made gene editing very significantly cheaper, easier and quicker.

Ongoing developments are rapidly expanding the range of applications that CRISPR may be used for in the lab. In particular, alterations to the Cas enzyme – the molecular scissors that cuts the genome – allow CRISPR to be used to edit the genetic code with unprecedented precision. Other modifications to the Cas enzyme expand the range of experiments that can be performed with CRISPR, since the level of expression of particular genes can now be altered without actually cutting the DNA.

I think that these developments have huge promise going forwards. The CRISPR/Cas system may now be used to perform a range of subtle genetic and epigenetic alterations on a very wide variety of species efficiently and quickly, expanding the ways in which we may study and combat disease.

As early career researchers my colleagues and I, working in laboratories across Oxford, discuss and stay abreast of the ongoing developments in the CRISPR field, and take an active interest firstly in their applications to bench biology experiments, but more widely and particularly to their applications in healthcare.

Thank you for your consideration. I would be very happy to answer any questions you may have.