Opportunities, Challenges and “How to” do Responsible research and Innovation
What is Responsible Research and Innovation?

Steve Miller
UCL-UK Hub for RRI
Department of Science and Technology Studies
University College London
Highly efficient Cas9-mediated gene drive for population modification of the malaria vector mosquito Anopheles stephensi

Valentino M. Gantz¹,¹, Nilole Jasinskiene², Olga Tatarenkova³, Aniko Fazekas³, Vanessa M. Macias³, Ethan Bier²,², and Anthony A. James³,⁴,⁴

¹Section of Cell and Developmental Biology, University of California, San Diego, La Jolla, CA 92093-0399; ²Department of Molecular Biology and Biochemistry, University of California, Irvine, CA 92697-3900; and ³Department of Microbiology and Molecular Genetics, School of Medicine, University of California, Irvine, CA 92697-4300

Contributed by Anthony A. James, October 26, 2015 (sent for review October 11, 2015; reviewed by Malcolm Fraser and Marcello Jacobs-Lorena)

www.pnas.org/cgi/doi/10.1073/pnas.1521077112
Look at the issues raised here
European Union Grand Challenges

Health, demographic change and wellbeing

Climate action, environment, resource efficiency and raw materials
European Union Agenda “keys”

“Mosquitoes no respecters of borders”
Governance
Law of unintended consequences

Mosquito - malaria
Law of unintended consequences

Sand fly - leishmaniasis
RRI Process Requirements

Anticipation and Reflection
Looks like “textbook” how to communicate science in a straightforward and factual way but it raises:

EU Grand Challenges as Outcomes

EU Agenda “keys”

EU “process requirements”

Public engagement
What is it that RRI is hoping to achieve?

<table>
<thead>
<tr>
<th>Learning outcomes</th>
<th>R&amp;I outcomes</th>
<th>Societal impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Engaged Publics</td>
<td>• Ethically acceptable</td>
<td>Contribute to solving societal challenges</td>
</tr>
<tr>
<td>• Responsible actors</td>
<td>• Environmentally sustainable</td>
<td>e.g. 7 Grand Challenges (EU)</td>
</tr>
<tr>
<td>• Responsible institutions</td>
<td>• Socially desirable innovations</td>
<td></td>
</tr>
</tbody>
</table>
How is RRI hoping to achieve this?

- Diversity & Inclusion
- Anticipation & Reflection
- Openness & Transparency
- Responsiveness & Adaptive Change
With whom and why?
We first need to educate citizens before they can participate!

RRI—-that’s just old wine in new bottles…

Science needs to become Responsible? So scientists are irresponsible now?!

RRI is about much more than only research! It is too demanding for researchers!

I find it difficult to grasp. What is it and why is it important?

Some possible misconceptions

RRI is the end of ‘true’ science

We first need to educate citizens before they can participate!
Opportunities

- The chance to bring science and society closer and avoid future controversies
- Democratic benefits from more engaged citizens
- Creating better innovations, new markets and increased competitiveness and creativity through wider input, problem focus and new networks
- Improving the culture of science and scientific careers by expanding the role of scientists in society
- To raise questions that have never been addressed
Needs for RRI

- Clear definition
- Evaluation tools
- Funding for structured meeting places (events, trainings, pilot projects...)
- Training and Dissemination
- Resources, tools and case studies
RRI Opportunities in Horizon 2020

Science with and for Society relevant topics in the Horizon 2020 Work Programme 2016-17
RRI Tools has assembled:

- Definition of RRI, Policy Brief, Catalogue of Promising Practices
- Explanations of the opportunities flowing from RRI, and what’s needed to overcome obstacles
- A toolkit of existing “RRI Tools” and our own “showcases”
- An RRI training programme for all and individual stakeholders
- An advocacy and dissemination programme
- A one-stop website – www.rri-tools.eu

Questions and Comments?