

Shared Ethics & Guiding Principles for Emerging Technologies:

A pre-requisite for BRICS Science Cooperativity

Shambhavi Naik, PhD
Research Fellow, Takshashila Institution
shambhavi@takshashila.org.in
@TheNaikMic

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RESEARCH FOCUS

Gene Editing Technologies

- **Gene Editing for Human Intervention**
 - Somatic/Germline gene editing
 - Therapeutic/Enhancement outcomes
- **Genetically Modified Organisms (GMOs)**
- **Gene Drive for Mosquito/vector-borne disease elimination**
- **Bio-Weapons**

Considerations – Technology

1. It is a nascent technology:

- Mosaicism
- Off-target effects

2. The technology is different from its applications

Considerations – Applications

Acceptability Threshold for Applications

- Is deafness a disability? Is treating baldness therapeutic? If yes, lightening of skin tone?

Assess the applications on their relative benefits

- A thalassemia-inflicted child in India suffers much more because of poorer standard of living. The relative benefit of gene editing for thalassemia is higher for India than other developed economies, although the risk of using the technology is the same.

Long term versus short term impacts

- Gene drives

Considerations – Applications

Societal benefit versus Aggravated Inequalities:

- Current cost is too high.
- Even as cost reduces, the applications will be unfairly available to a select section of society, without external intervention.

Societal benefit versus individual values:

- Pew Research study shows faith as a strong determiner of accepting germline gene editing – should heterogeneous societies not promote these technologies even though it is in their overall interest?

ETHICS: A COMPLEX DISCUSSION

- Is Human genome Sacrosanct?
- Are we 'Playing God'?
- Rights of the Differently-Abled
- Respect for Individual Choice and Life

GUIDING PRINCIPLES EMERGING TECHNOLOGIES

- **Scientific progress must not be inhibited by regulations**
- **A technology and its applications should be viewed separately**
- **Regulation is better than outright prohibition**
- **Global and national interests must be balanced**
- **Policymaking must be scientific and inclusive**

PROPOSED STEPS

- Formation of a BRICS ethics working group at a national and at a consortium level
- Creation of policies to address non-ethical concerns – the state groups could work together to deduce acceptable thresholds of risks
- Developing mechanisms & processes for information sharing on risks and benefits

THANK YOU

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