

# Learning from The Gain of Function Experiment Debate

Mirror Image Biology: Pushing the Envelope in Designing Biological Systems –  
A Workshop

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# Gain of Function Debate

- 2011: H5N1 influenza
  - rare human cases from direct exposure to birds
  - can avian H5N1 influenza virus become human-to-human transmissible?
  - serial passage in ferrets led to airborne transmission
  - should results be published?
  - discussion on this particular experiment
- 2019: COVID-19
  - was source a lab accident?
    - was virus genetically modified?
  - discussion doesn't make distinctions about different types of GOF experiments

# Mirror Biology

- need to make distinctions clear
  - mirror biology (general)
  - mirror life (specific)

# Assessing risk

- research has inherent risks that can be minimized but never fully abolished
  - efforts must be made to assess the benefits and risks to ensure that they are on the table and considered carefully
- the problem: benefits and risks in these cases difficult if not impossible to quantify
  - when will basic knowledge become useful?
  - pandemic pathogen risk estimates have large error bars

# Questions to ask about high risk experiments

- Does the experiment address a problem that will clearly benefit humanity?
- Are there ways to address the problem that present lower risks and still get to the answer efficiently?
- Can the work be done safely and securely?

# Final thoughts

- experiment review prior to initiation
- ongoing attention to biosafety facilities and protocols
- the public must be considered
  - currently, huge amount of distrust of science
  - need to be extra cautious in what we do and how we talk about it