Three Bad Arguments Concerning Genetic Research:

1) **Free Inquiry Principle:** Scientists should have full and unqualified freedom to pursue whatever inquiries they may choose to pursue. Regulation would interfere with scientific liberty.

**Question:** What underlying rights are relevant to the right to pursue scientific research? What weight should claims of intellectual liberty or the liberty to pursue research receive when they come in conflict with other public values? (Example: Stem Cell research)

2) **Doomsday Scenario Argument:**
   (i) We cannot say with assurance that the probability of disaster resulting from rDNA research is zero.
   (ii) All endeavors that might possibly result in such a catastrophe should be prohibited.
   (iii) Therefore rDNA research should be prohibited.

3) **Boundary Crossing Enthymeme:**
   (Enthymeme: An argument with a missing premise.)
   (i) Recombinant DNA methods enable scientists to move genes back and forth across natural barriers.
   (ii) Missing Premise. Two alternatives:
      (a) Natural barriers should not be breached.
      (b) If we do not know with considerable assurance that the probability of an activity leading to disastrous consequences is very low, then we should not allow the activity to continue.
   (ii) Therefore, severe restrictions on rDNA research are in order.

**Risks and Benefits:**

1) Problems about probabilities: Some outcomes of rDNA experimentation cannot be determined by experiment; indeed there may be negative consequences we can’t take into account because no one has thought of them.

2) Weighing harms and benefits: How are we to assign an index of desirability to the possible total outcomes of each policy? (Can we weigh lives against economic benefits?)

3) Problems about Principles:
   - Utilitarian Principle
     “Avoid Doing Harm.”
     “Weigh harms more heavily than benefits.” (What counts as a harm/benefit in the case of rDNA research? What is “the normal course of events” s.t. a policy can be said to harm or benefit particular persons?)
Long Term Risks:

1) “If a line of research can lead to the discovery of knowledge which might be disastrously misused, then that line of research should be curtailed.”

2) “If a line of research has a high probability of leading to the discovery of knowledge which might be disastrously misused, then that line of research should be curtailed.”

Formulations of the Precautionary Principle:

Article 15 of the 1992 Rio declaration:

“In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.”

Wingspread Statement: Johnson Foundation, January 1998 from a meeting of lawyers, scientists, policy makers and environmentalists:

“When an activity raises threats of harm to the environment or human health, precautionary measures should be taken even if some cause and effect relationships are not fully established scientifically.”

Three Elements:
- Threat of Harm
- Uncertainty of Impact and Causality
- Precautionary Response

Questions:
- What counts as a threat of harm? Is any potential harm, no matter how small, sufficient to trigger the precautionary principle?
- How does uncertainty figure into this? Is any level of uncertainty sufficient to trigger the principle, or only a high level? Is there any level of uncertainty which would be so great that the principle would be unreasonable?
- What counts as a precautionary measure? Crossing one’s fingers? Warning people of the threat? Taking measures to reduce impact of the effects? Taking measures to prevent the effects? Taking measures to eliminate the cause of the effects?

“Without any scientific grounds, but on the basis of the so called precautionary principle—that is, if we can’t prove absolutely that it is harmless, let’s ban it—the [European] Union has prevented genetically modified food from the United States from entering its markets.”

**Example:**
Suppose that in a given situation you have two actions, A and B, available to you.

A: If you choose A, then there are two possible outcomes: either (A1) you will receive $100, or (A2) you will be shot.
B: If you choose B, there are also two possible outcomes: either (B1) you will receive $50, or (B2) you will receive a slap on the wrist.

**MAXIMIN: Choose B Because:** (A2) [getting shot] is the worst outcome on option A and (B2) [getting a slap on the wrist] is the worst option on plan B; and (A2) is worse than (B2).

**Harsanyi on Maximin:**

“Suppose you live in New York City and are offered two jobs at the same time. One is a tedious and badly paid job in New York City itself, while the other is a very interesting and well-paid job in Chicago. But the catch is that, if you wanted the Chicago job, you would have to take a plane from New York to Chicago (e.g., because this job would have to be taken up the very next day). Therefore there is a very small but positive probability that you might be killed in a plane accident.”

-Harsanyi, 1975

“If you took the maximin principle seriously then you could not ever cross the street (after all, you might be hit by a car); you could never drive over a bridge (after all, it might collapse); you could never get married (after all, it might end in a disaster), etc. If anybody really acted this way he would soon end up in a mental institution.”

-Harsanyi, 1975

**Ultra-Conservative Precautionary Principle (UCPP):** Ban any activity that one has any reason whatsoever to suspect might pose any harm whatsoever.

**Ultra-Minimal Precautionary Principle (UMPP):** We accept the need to act in a precautionary manner in just one case: we should cross our fingers (or just worry) in the situation where there is a probability of 99.9% that the world is going to end immediately due to this experiment.

**Gardiner’s Procedural Precautionary Principle:** (1) The precautionary principle is “empty” because the notion itself is essentially contested. (2) The specific regulatory meaning of ‘precaution’ must be worked out through democratic consultation.