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FINAL EXAM – BI/FS 430(H)/530 – Fall 2004

DEFINITIONS (1 pt each)

Briefly define the following (~5-10 words)

1. APHIS
2. FIFRA
3. Enviropig
4. Prodigene
5. *Bacillus thuringiensis*
6. Telos
7. Domestication
8. NOAEL
9. Ames test
10. POP
11. PIP
12. Biolistics
13. Precautionary Principle
14. Cry9c
15. Dietary supplement
16. Ti plasmid
17. Substantial equivalence
18. Paracelsus
19. Phactory
20. Reporter gene

SHORT ANSWER (2 pts each, <~15 words)

21. What is rBST and what are two reasons it is controversial?

22. When asked what “are you most concerned about when it comes to food safety,” what approximate percentage of American consumers list biotechnology as a concern (>90%, 40 to 60%, or <10%)?

23. Why are 70% of foods in US supermarkets considered to be “genetically modified (engineered)” yet only a very few species of transgenic crops are authorized for commercial use?

24. What are two criteria used by the EPA to help decide if a new protein produced in a transgenic crop is likely to cause allergies in humans?

25. Why are two reasons that the use of a dwarfing gene was important to the green revolution?

26. Why do genetic engineers consider it very important, for the purposes of producing a commercial transgenic crop, to examine progeny that were produced after inserting the same gene many different times?

27. Approximately how many chemicals (to an order of magnitude), selected on what basis, would the European Union require the testing of (~over the next decade) under its newly proposed chemical safety law?

28. What were two concerns posed by the FDA Deputy Commissioner in a letter to Oregon Governor Kitzhaber in response to Oregon’s proposed GMO labeling law (ballot measure 27, 2002)?

29. What are two reasons for concern about DDT for human health given in the review article by Turosov et al. published in Environmental Health Perspectives in 2002?
30. In the article on ethics by Iowa State University Extension Service and Office of Biotechnology, they stated that: Empirical Claims + Ethical Principles = Ethical Conclusion. What is one example of an ethical claim and one example of an ethical principle that would be applied to the case of Bt corn?

VERY SHORT ESSAY (4 pts each, <~25 words)

31. What are two criteria that define organically certified food? Why is the organic food movement viewed as being opposed to GMO crops?
32. In the article by Marcus and Grollman in the New England Journal of Medicine in 2002, what are two of the reasons they gave for their view that new regulations are needed for botanical medicines?
33. What were two of the conclusions reached by the Nuffield Council on Bioethics in their follow-up paper that examined the ethical justification for use of GM crops in developing countries?
34. What is minimum tillage agriculture, and what is its connection to herbicides and transgenic crops?
35. What is the goal for development use of Roundup-Ready bentgrass, what is its status re. commercial use/deregulation, and why does the Nature Conservancy oppose it?

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36. Considering animal or plant domestication, what are four kinds of traits that were consciously or unconsciously selected during early stages in domestication.

37. What three federal agencies regulate crops and foods derived from transgenic modification in the USA, and what are their general roles?

38. What are two concerns related to ethical acceptability of animal biotechnology?

39. What are “promoters” and why are they important in genetic engineering? Give one example of a promoter used in plant biotechnology?

40. Given that you have a genetically engineered *Agrobacterium* strain to start with, describe four steps, and their purposes, that are generally employed in producing a transgenic plant ready for testing in the field.

41. What is the “Brazil nut saga” and what did it teach us about the safety of genetically engineered crops?

42. Outline the general method by which adult animals are cloned.

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43. What are two of the broad types of evidence discussed by Mendelsohn et al. of the US EPA in support of the safety of Bt crops in their 2003 paper (“are Bt crops safe?”).

44. What are two reasons for interest in the production of pharmaceuticals in food crops in farm fields, and two reasons not to use food crops in farm fields for such purposes?

45. What is golden rice, and what is the main reason for creating it? What is its status with regard to commercial development? What are the two concerns of those opposed to it?