Scenario C
Funny Mutton Disease (FMD)

Summary of Experiment
This is a FMD vaccine challenge study using bovines. Both control and challenge animals are housed in sealed environments, which are isolated from each other, with directional and HEPA filtered exhaust air. Liquid waste routed through open pipes to liquid waste cookers at a different location at the institute. Persons are required to don coveralls and rubber boots prior to entering animal pens, upon leaving animal pens, the coveralls and rubber boots are rinsed with a decontamination solution for reuse. Vaccines being tested have been imported from another country. Animals are exposed to FMD via intranasal exposure. Lyophilized FMD isolates are stored in a lock box located in the common area of the animal warehouse. Periodically, FMD isolates are grown and lyophilized – this work is done in a laboratory area located at another building. Untreated solid waste is sent to public trash disposal.

There have been no known cases of human FMD infections. Because FMD does not infect humans, but spreads rapidly among animals, it is a much greater threat to the agriculture industry than to human health.

Agent Criteria

Infectious Dose: By inhalation: 10,000 virus particles (swine); 400,000 virus particles (calf)

Stability:

Susceptibility to disinfectants: FMD virus is highly sensitive to changes in pH and can be deactivated by solutions with pH’s below 7 or above 8.5. Thus, any acidic or alkali solution, mixed with a detergent to facilitate penetration into different surfaces, is effective. Examples include 0.2% citric acid, 10% formalin solution, 4% sodium carbonate, 2% sodium hydroxide, others.

Physical inactivation: Heat-labile (temperatures above 50°C), sensitive to UV irradiation.

Survival outside host: Can survive over a year in fat-contaminated wood, between 26-200 days in soil, sacking or straw; 35 days on cardboard, wood, or metal contaminated with blood; up to two weeks on wool; 4 weeks on cow hair; 14 days on dry manure; 34-42 days on liquid manure, 21 days in wash water from pens, indefinitely in freezing temperatures.

Incubation Period: 2-14 days, depending on species

Mortality Rate: 5%, up to 90% in young animals

Morbidity Rate: Close to 100%

Duration of Illness: 7-14 days

Severity of Illness: Mild to Severe

Duration of Infection: 28 days maximum for normal infection; a carrier state is possible.

Long term effects after infection: Poor health, reduced yields

Allergen (yes/no): No

Carcinogenic/mutagenic (yes/no): No

Abortogenic (yes/no): Yes

Toxin Production (yes/no): No

Immune Suppression (yes/no): No

Ability to Mutate in Host or Environment (yes/no): Yes
**Infection Mitigation Measures:**

*For animal pathogens*

- **Detection Possible:** Yes (ELISA, PCR, cell culture, virus isolation, others)
- **Culling:** Yes
- **Prophylaxis:** No
- **Immunization:** Yes
- **Post Infection Treatment:** No

**Routes of Infection:**

- **Inhalation:** Yes
- **Ingestion:** Yes
- **Percutaneous:** Possible
- **Contact:** Yes
- **Vector-Borne:** No (except as carried on animate and inanimate surfaces, like human clothing or vehicles)
- **Sexual Transmission:** Yes
- **Vertical Transmission:** No

**Communicability:**

- **Human to Human:** No Evidence
- **Human to Animal:** No Evidence
- **Animal to Animal:** Yes
- **Animal to Human:** No Evidence
- **Multiple Species:** Yes (swine, sheep, goats, deer, water buffalo, other cloven-hoofed ruminants)

**Where it is present:** The FMD situation has improved markedly in recent years particularly in Europe and some countries in south east Asia and South America. However, the disease remains endemic and at a high prevalence in many countries in Africa, the Middle East, Asia and South America. Europe, North and Central America, Pacific nations and the Caribbean are free of the disease. Most countries free of the disease restrict the storage and study of it to a small number of facilities within their borders, to reduce the likelihood of accidental release.

**Perception of malicious use:** MEDIUM

**Culture:** Culture of FMD for diagnostics purposes can be performed by inoculation of primary bovine thyroid cells, primary pig, calf, and lamb kidney cells, or BHK-21 and IB-RS-2 cell lines. Cell cultures are observed for CPE (cytopathic effect, evidence of viral infection). Vaccine production involves large-scale culturing and killing of FMD virus.

**Equipment:** Coveralls, rubber boots, ethanol spray for rinsing PPE, nasal swabs, air handling system with HEPA filters on exhaust, liquid waste cookers, high pressure washers, animal feed and water.

**Lab Environment:** FMD not present in country, large agricultural community and industry, animal warehouse not open to public, but external doors left open during the day. Access limited to animal handlers and laboratory personnel only. Animal handlers not required to be vetted through same hiring program as laboratory personnel.

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1 **Please Note: The information contained in these pages is intended for training purposes ONLY. Do not rely on this information to make critical biosafety or laboratory biosecurity decisions.**