

# Will Medical Boundaries Help Curb Gene Doping in Sport?

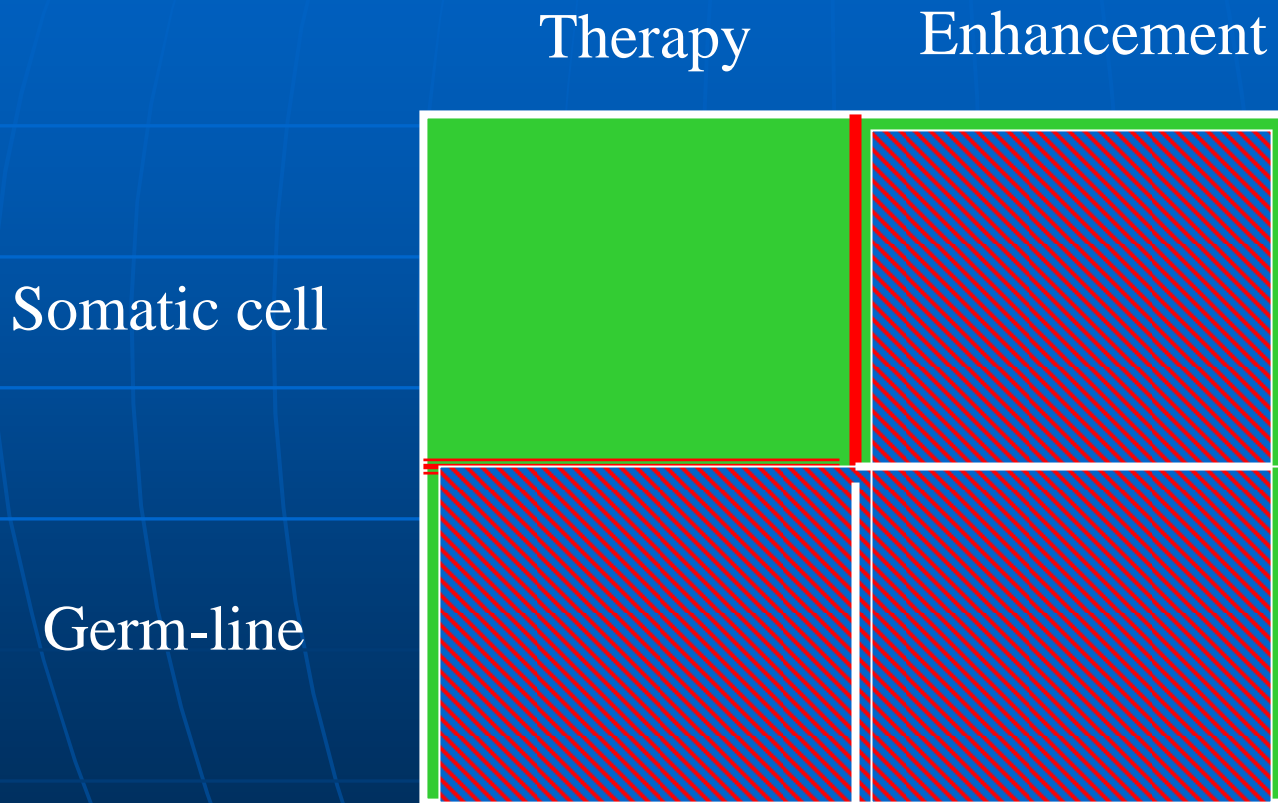
(Or: Why the En/Tx  
Distinction Can't Hold WADA)

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# Limits of human gene transfer, c. 1995 (after L.W.)



## The enhancement/treatment distinction invoked in sports:

Virtually all doping substances are medicines, most of them obtained only on prescription. They are intended for the prevention or cure of disease or alleviation of disease-related symptoms. Their administration to healthy young people is against basic pharmacotherapeutical principles and represents, therefore, medical malpractice."

Arne Ljungqvist, 2005

“the non-therapeutic use of cells, genes, genetic elements or the modulation of gene expression, having the capacity to enhance athletic performance, is prohibited”  
(WADA, 2005)

# Two “Enhancement” Conversations

- What are the proper limits of health care?
  - “enhancement vs. treatment”
- What are the proper limits of self-improvement (e.g., in sport)?
  - “enhancement vs. *achievement*”
    - (Where “achievement” = “virtuous perfection of natural talents”)

# Theories of the Enhancement/ Treatment Distinction as a boundary marker for medical practice

- Professional Domain accounts (Kass, Pellegrino):
  - Txs pursue healing goals of medicine
  - Enhancements pursue non-medical goals “beyond therapy”
- Normal Function accounts (Daniels, Brock):
  - Txs restore one to typical range of functioning for reference class
  - Enhancements lift one above normal range
- Disease-Based accounts (Gert, Richter):
  - Txs target pathological phenotypes (diseases/disabilities)
  - Enhancements target healthy traits (strengths/abilities)

# 1. Holes in the Professional Domain account

- Medicine's notorious nosological elasticity: performance problems are easily medicalized, to enable "tx".
- Sport's Medicine's special domain and mission actually includes performance enhancement anyway?

# Sports Medicine's Domain?

Patients who are athletes do not necessarily want to get well or to be free of pain. For many athletes, the simple goal is to get back on the playing field able to perform. *In the relatively healthy population of athletes, supporting athletic achievement (and not reducing suffering or prolonging life) becomes the physician's reason for being.*

Bernstein, Perlis and Bartolozzi, "Ethics in sports medicine" *Clinical Orthopaedics and Related Research* 378 (2000): 50-60

## 2. Holes in the Normal Function account:

- Difficulties in setting reference class for normal function: personal genome, age, training peer-group, SES, race, gender, species, etc.
- Preventive interventions often strengthen body beyond normal function levels, to better resist injury and disease.

3. **How is gene therapy being studied in the treatment of cancer?**

Researchers are studying several ways to treat cancer using gene therapy. Some approaches target healthy cells to enhance their ability to fight cancer. Other approaches target cancer cells, to destroy them or prevent their growth. Some gene therapy techniques under study are described below.

- In one approach, researchers replace missing or altered genes with healthy genes. Because some missing or altered genes (e.g., p53) may cause cancer, substituting “working” copies of these genes may be used to treat cancer.
- Researchers are also studying ways to improve a patient’s immune response to cancer. In this approach, gene therapy is used to stimulate the body’s natural ability to attack cancer cells. In one method under investigation, researchers take a small

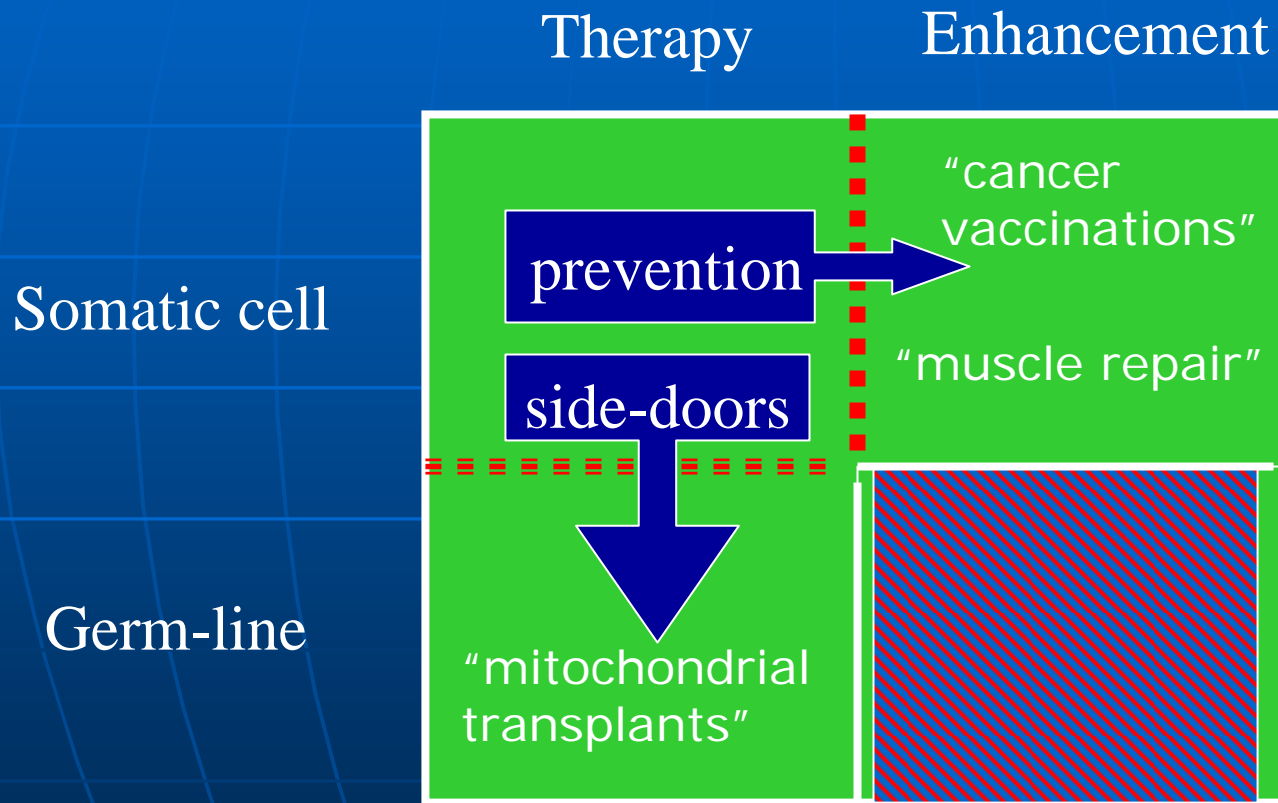


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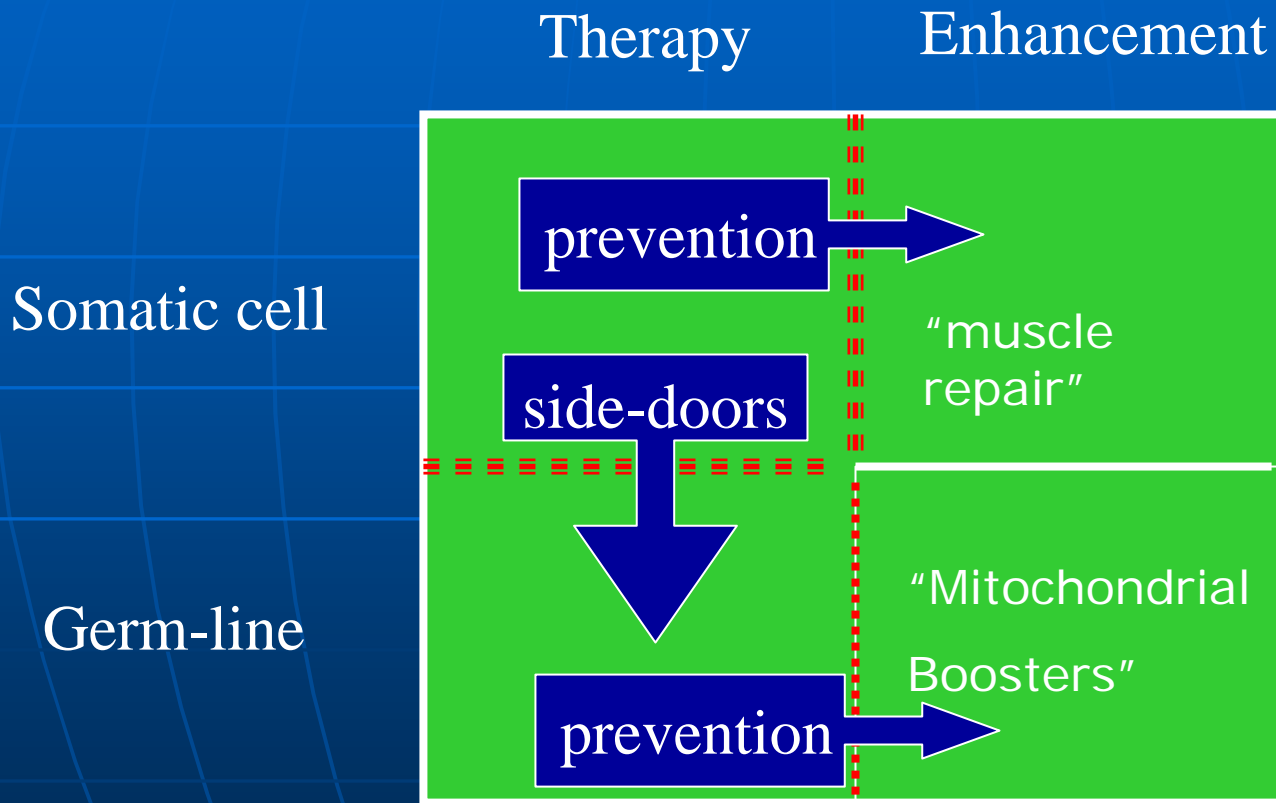
# Limits of Human Gene Transfer, c. 2005



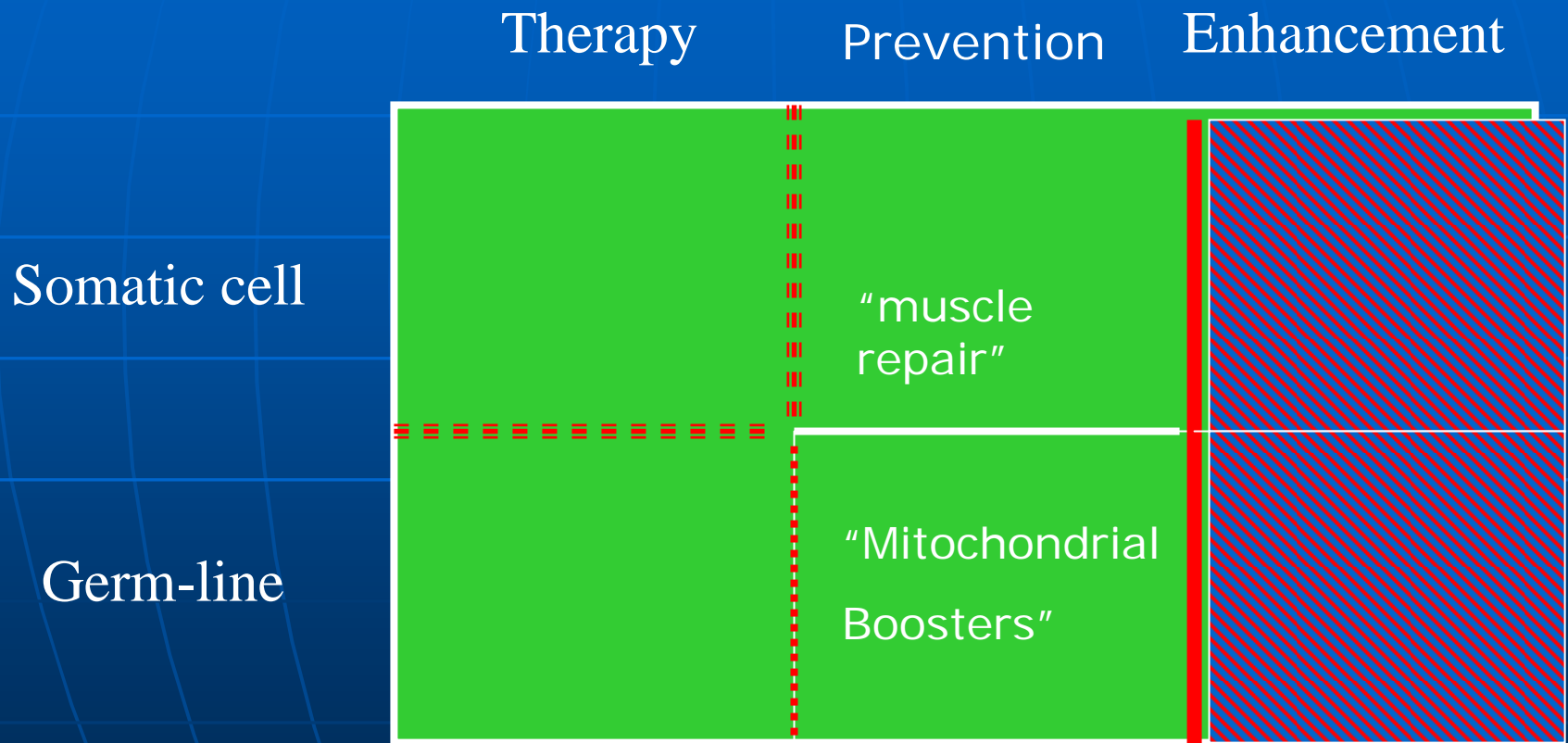
# Imagine:

- Genomics teaches us more about mtDNA, and we learn how to screen cells for mitochondria that are high within the normal range of energy-producing efficiency.
- These are used in reproductive medicine to help prevent mitochondrial insufficiency problems. It works and, in fact, the increased energy efficiency has other health benefits as well.
- Why not offer such organelle transplants routinely to couples undergoing IVF, as a form of “prefertilization vitamins” or “developmental energy boosters”?

# Limits of Human Gene Transfer, c. 2025?



# Maybe we need more drawers?



### 3. Holes in the Disease-based account

- *bona fide* injury and disease prevention interventions have skirts wide enough to cover performance enhancing “side effects”.
- Once developed as treatments/preventions aimed at disease, the same interventions can be used “off-label” for enhancement.

# Under the skirts of prevention:

- Muscle enhancement in athletes to prevent muscle damage.
- Mood enhancers to prevent stress-related illness.
- Cognitive enhancers to prevent accidents.
- Chloroplasties to prevent malnutrition?

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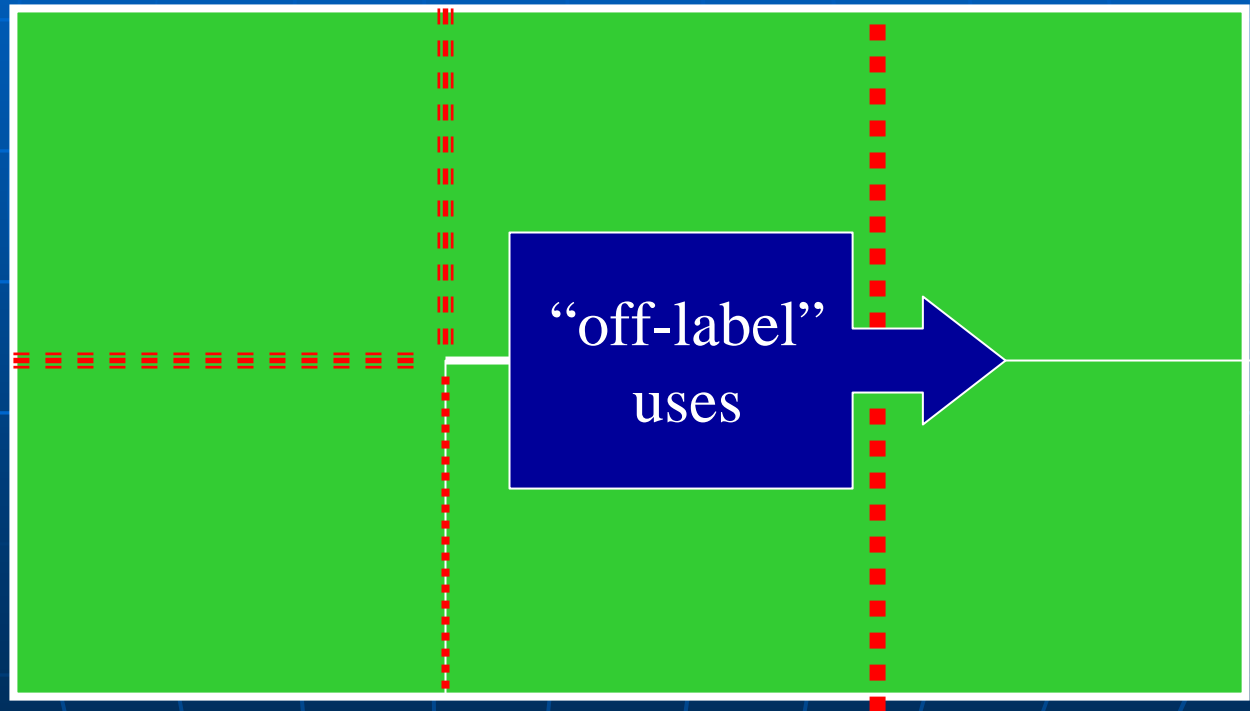
Therapy

Prevention

Enhancement

Somatic cell

Germ-line



# Assessing Physical Risks of Off-label Enhancement uses of Tx technologies: a growth research industry

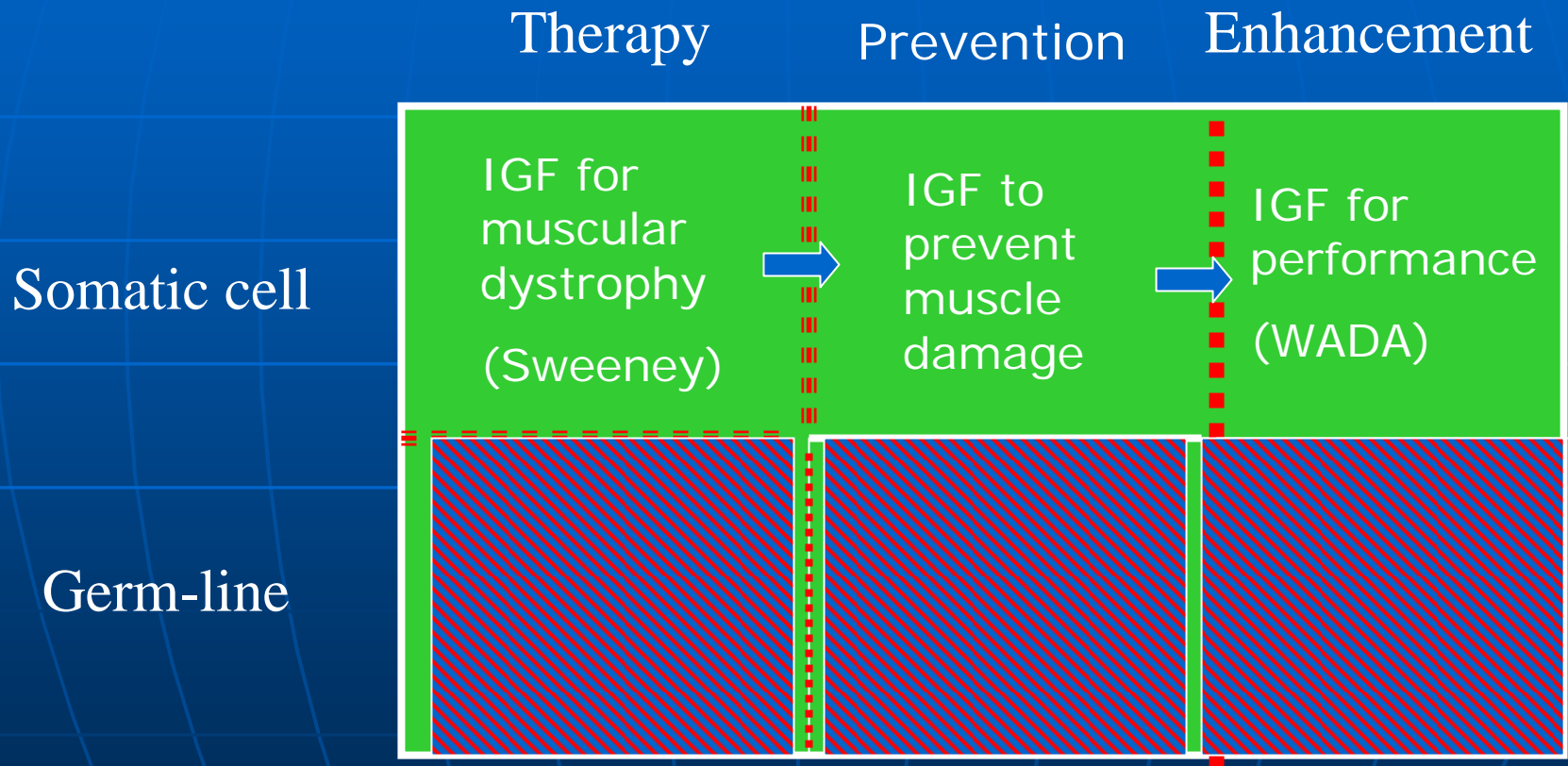
- HGH safety and efficacy trial in short normal children.
- Sports medicine research on risks of performance enhancing drugs
- “Phase IV” studies of enhancing uses of psychotropic drugs, Viagra, etc.

# Special Issues in Off-label Enhancement Risk Assessment Research

- Defining “safety”: How balance physical risks with social benefits?
- Defining “efficacy”: what are the endpoints?
- Recruiting subjects: New classes of “vulnerable populations”?
- Respecting subjects: What about the “egotistic misconception”?

- If these questions can be answered, doping interventions will increasingly arrive “pre-assessed” for the physical risks of their enhancement uses, along one of two routes:
  - In being tested (“offensively”) for use as a form of prevention against disease
  - In being tested (“defensively”) as an off-label use of an approved Tx

# gene doping's flow through medicine's sieves



# Conclusions

- Medicine's boundaries are leaky for:
  - "side effect" performance enhancement s
  - "preventive" performance enhancements
  - "off-label" performance enhancements
- WADA must engage in the other enhancement conversation, about the ethics of achievement in sports, to articulate and defend its anti-gene doping policies.

# Enhancement vs. Achievement: Back to Basics

- Are enhanced human achievements authentic?
- Are enhancements fair ways to accomplish achievements?
- Would enhancements exacerbate injustices?



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