

Gene Doping



Challenging & legislation

what is the responsible said about
gene doping ?





**Dr. Jacques Rogge (IOC) president
November 15, 2007**

- **"I am getting more and more anxious that this [*gene doping*] may be misused by athletes and coaches,"**
- **We are challenged by new forms of unfair practices and the prospect of gene doping. We must work with researchers, laboratories and the pharmaceutical industry for better science.**
- **Methods to detect the use of genetic modification to enhance athletic abilities are still in the early stages**



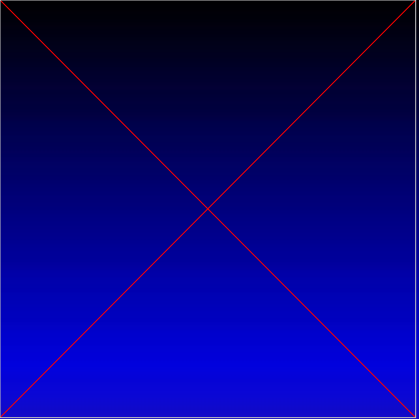
Theodore Friedmann, the leader of WADA's gene doping panel

- **"It will disappoint us but not shock us if somebody has already used genetic enhancement,"**
- **it is impossible to say when methods would be ready to detect gene doping, which WADA believes is not happening yet, though no one can be sure.**
- **This is a very dangerous road, "It will happen," he says, "but we don't know when." ,**

Gene doping in sport: fact or fiction?

- **Gary Bell's** talked about the Olympics and genetics.
 - **Gary Bell** made mention of this in 2004 during the Olympics in Athens, and now this year we are seeing these genetically engineered athletes again.
 - **2004 Olympics, Yuliya Nesterenko.** The Americans where **HEAVILY** favored to win, this girl comes out of nowhere, showed nearly no signs of fatigue after the race was over while the other athletes, like normal people, were dead tired. As for genetics goes, her thighs are massive.
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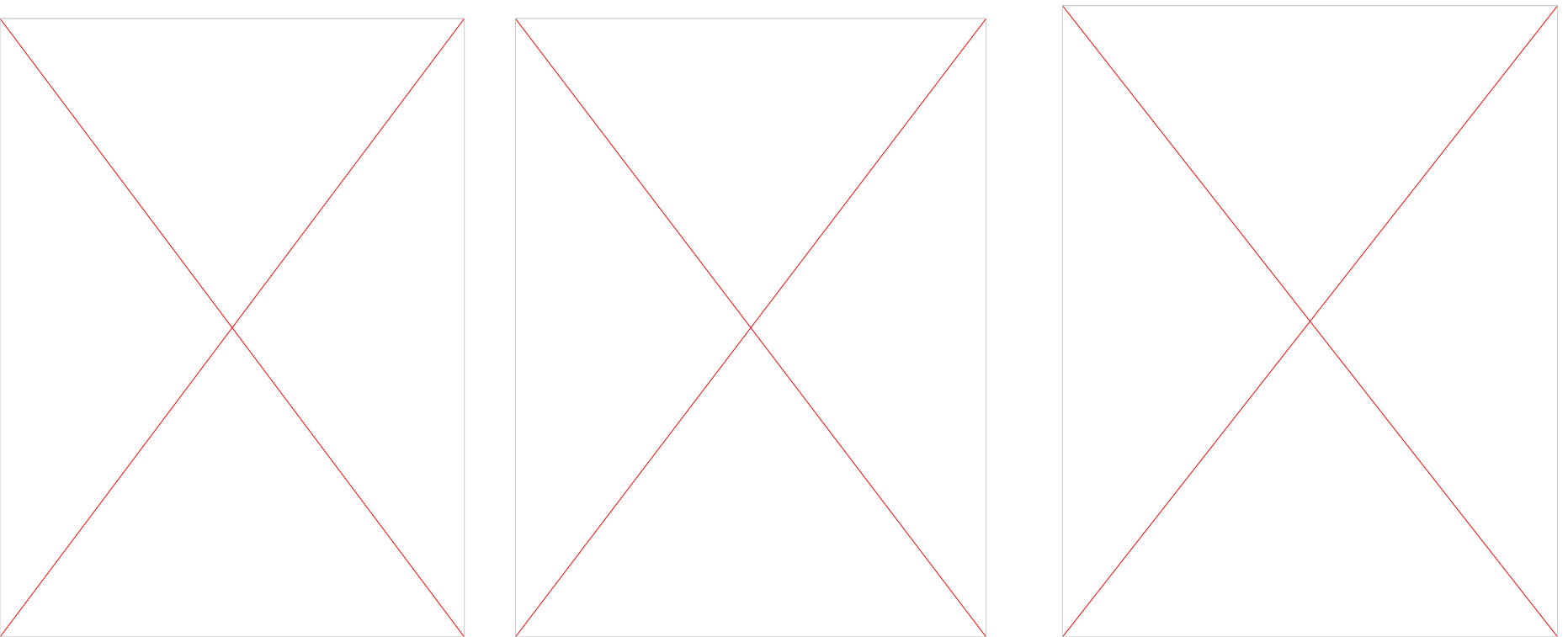
John Leonard, executive director of the American Swimming Coaches association , We are really naive if we are to believe that the Chinese at this point are clean or that they are the only country in the world that is experimenting with genetic enhancement as we speak,"





On the other hand

- the research is still at only an experimental stage
- Experts believe it is only a matter of time before athletes manipulate their genetic material to gain an unfair advantage despite the current lack of proven cases.



What is the gene doping?

- namely as the misuse of techniques of gene therapy and cell therapy



Gene Doping and Gene Therapy

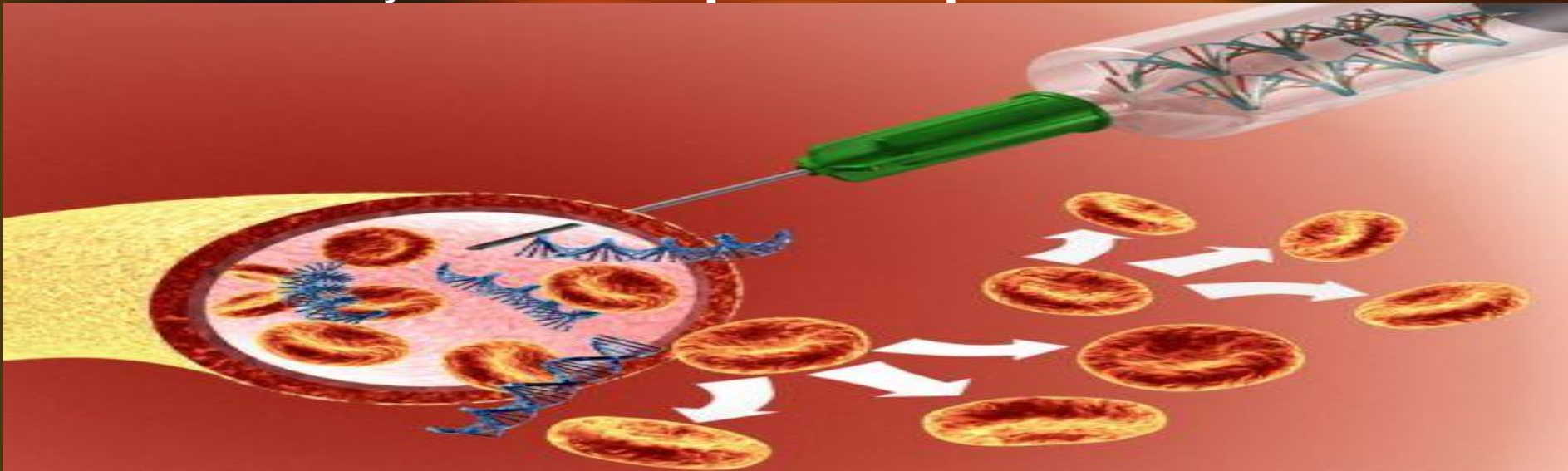
Gene doping is an outgrowth of *gene therapy*. However, instead of injecting *DNA* into a person's body for the purpose of restoring some *function* related to a damaged or missing *gene*, as in *gene therapy*, *gene doping* involves inserting *DNA* for the purpose of enhancing athletic performance

Gene therapy is a “scientific process of inserting genes into the body’s cells to correct genetic flaws that cause diseases such as juvenile diabetes, haemophilia, and cystic fibrosis.”

The technology used for gene doping is exactly the same as gene therapy

Gene Doping Risks

- It's hard to say what would happen to an athlete who tried gene doping. In the world of human experiments, scientists have only transferred genes to make sick people healthy, not healthy people better.
- Consider the EPO gene. A drug called Repoxygen delivers the EPO gene with some controls, so that when blood oxygen dips below normal, the body makes enough red blood cells to restore normal oxygen. The gene then shuts off [source: Binley]. Athletes seeking an edge probably would want better-than-normal blood oxygen. They could try adding the EPO gene with no controls. But in healthy monkeys who received that treatment, blood became so thick with red blood cells that researchers had to bleed the monkeys to prevent heart failure and stroke. Eventually, the monkeys were euthanized [source: Svensson].
- Other risks exist. Here's a big one: cancer. Cancer can happen if a genetic modification accidentally turns on a cancer gene or turns off a cancer-suppressing gene
- The action of the genes can cause problems, too. For example, the genes for human growth hormone and IGF-1 tell cells to divide. If they get into the wrong cells, cells can divide uncontrollably and form tumors [source: Wells].



What is the challenging?

- A look at the medal podium in almost any international sporting competition reveals that some athletes and certain countries enjoy regular success in particular events. One of the most compelling examples is that of East African runners and their domination of international distance running competition. This phenomenon has led to the suggestion that East Africans possess some inherent genetic advantage predisposing them to superior athletic performances

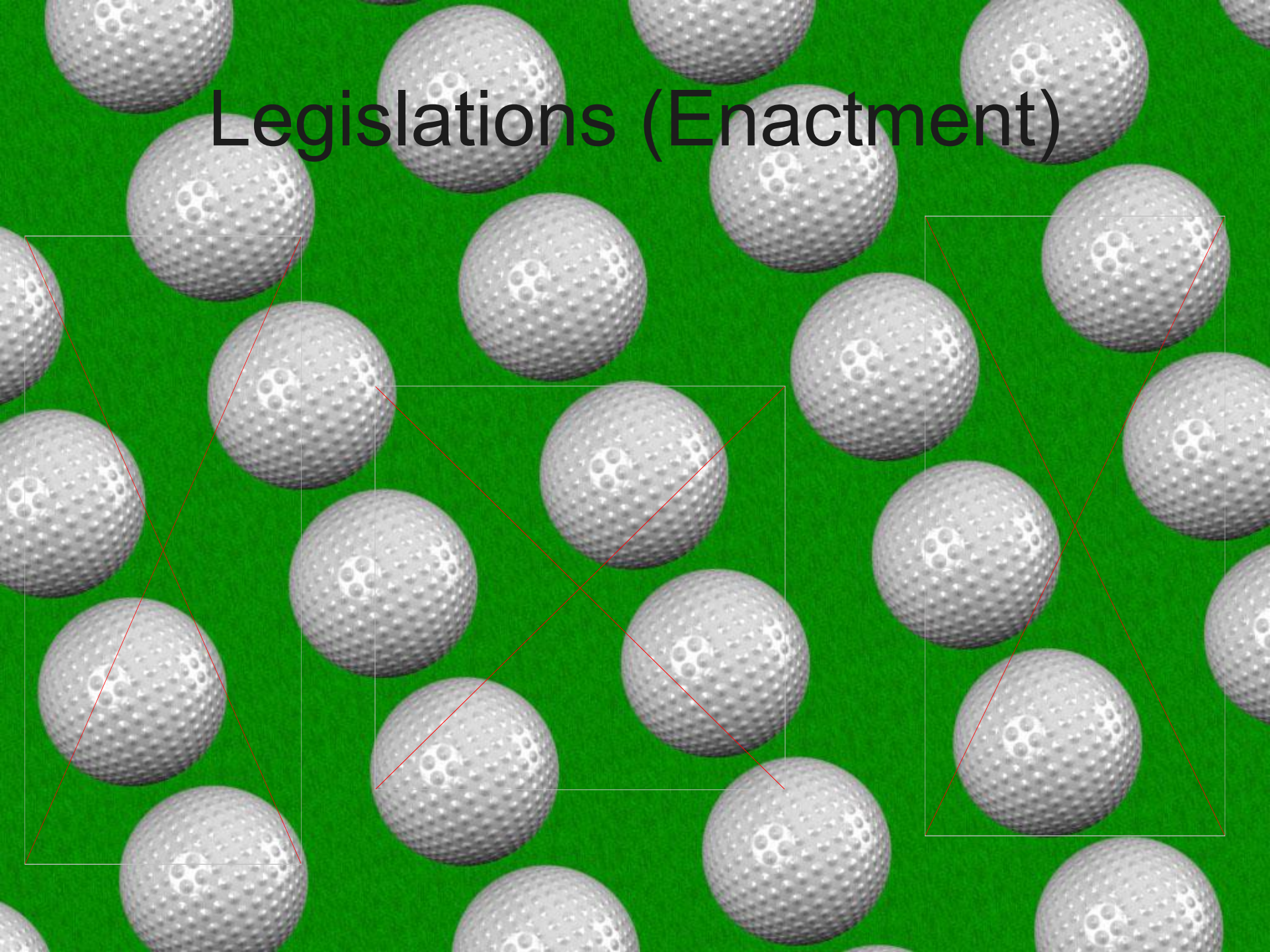


Distance	Athlete	Time	Ancestral Origin
100m	Asafa Powell (JAM)	9.77s	West Africa
110m Hurdles	Xiang Liu (CHN)	12.88s	Asia
200m	Michael Johnson (USA)	19.32s	West Africa
400m	Michael Johnson (USA)	43.18s	West Africa
400m Hurdles	Kevin Young (USA)	46.78s	West Africa
800m	Wilson Kipketer (KEN)	1:41.11	East Africa
1000m	Noah Ngeny (KEN)	2:11.96	East Africa
1500m	Hicham El Guerrouj (MOR)	3:26.00	North Africa
Mile	Hicham El Guerrouj (MOR)	3:43.13	North Africa
3,000m	Daniel Komen (KEN)	7:20.67	East Africa
5,000m	Kenenisa Bekele (ETH)	12:37.35	East Africa
10,000m	Kenenisa Bekele (ETH)	26:17.53	East Africa
Marathon	Paul Tergat (KEN)	2:04:55	East Africa

Nature and nurture



Legislations (Enactment)



FIRSTLY ,

- Gene doping is against the rules in many sports. In 2003, WADA put gene doping on its prohibited list [source: USADA]. Many sports governing bodies accept and use the list, thereby prohibiting gene doping for athletes participating in the Olympics, Paralympics and many other events

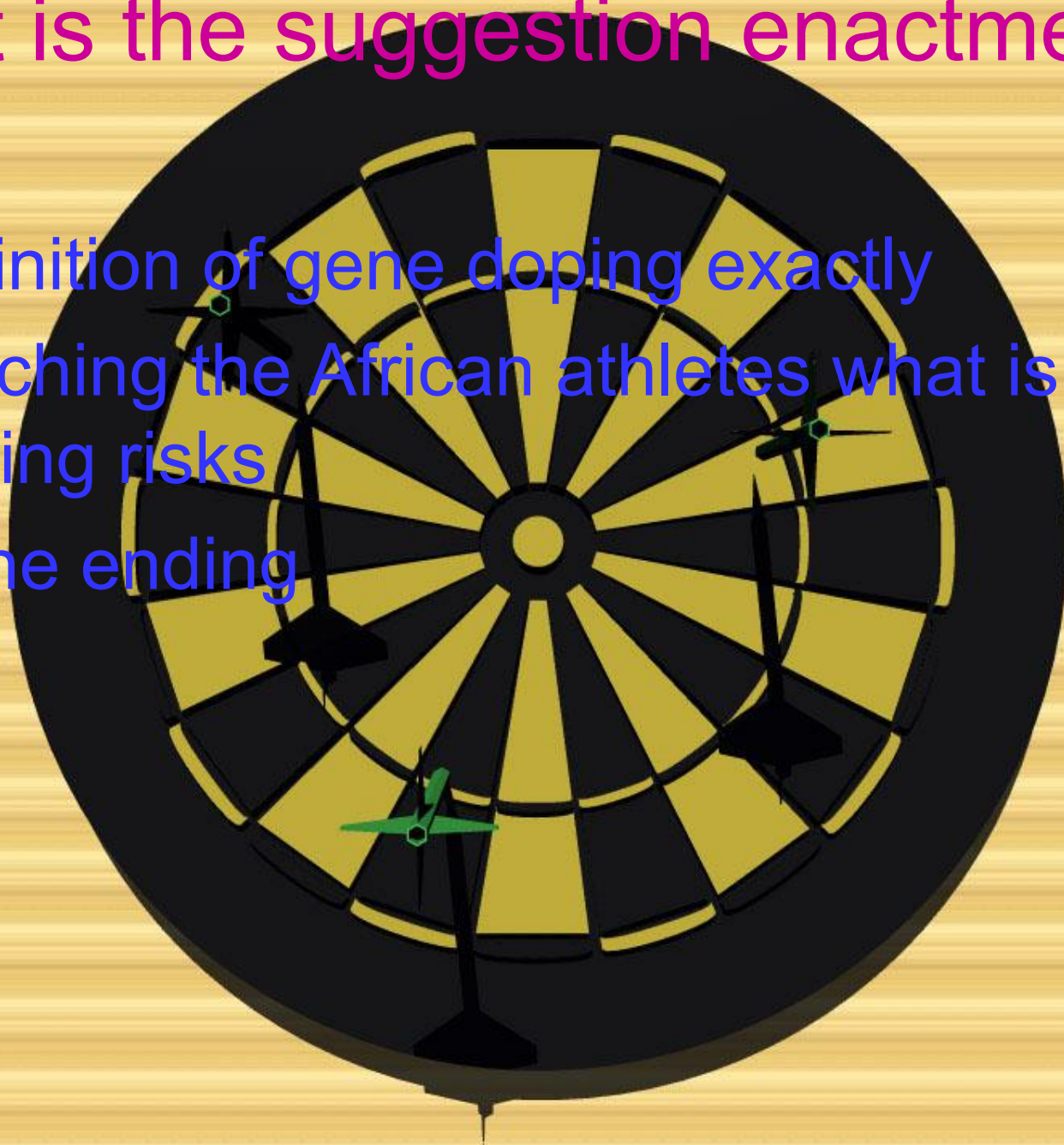


USA law

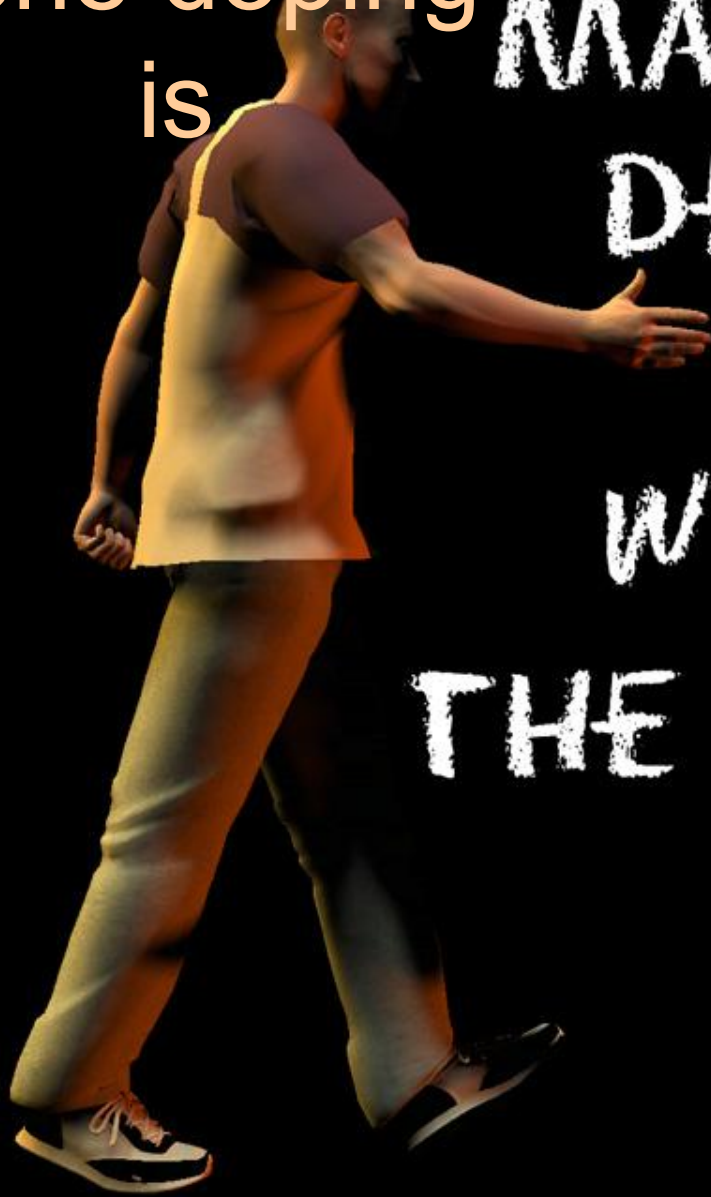
- In December 2006, the President signed Public Law Number 109-469, making **gene doping** illegal for amateur athletes in the United States. This important **law** prevents athletes from endangering their lives with genetic modification and protects the integrity of sports competition. In 2003, the World Anti-Doping Agency (WADA) also prohibited **gene doping** for all Olympic athletes . It is imperative that [your organization] also adopt an anti-**gene doping** policy to protect human health and maintain an even playing field for all athletes.

What is the suggestion enactments ?

- Definition of gene doping exactly
- Teaching the African athletes what is gene doping risks
- In the ending



Gene doping
is



MAKE A
DEAL
WITH
THE DEVIL

