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Potential for Non-Invasive Imaging in Anti-Doping Efforts

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Outline of Presentation

- Background Information
- Imaging methods that may be immediately applicable to gene doping
- Imaging methods that have potential to detect gene doping, but require more time and research
 - These imaging methods may help validate other analyses of gene doping
- Points for Consideration

Potential Imaging Targets

■ Direct Targets:

- The transferred gene
- **Products from the transferred gene**

■ Indirect Targets:

- **Changes in metabolism due to chronic exposure to transferred gene products**
- **Changes in anatomy due to chronic exposure to transferred gene products**
- **Inflammation arising from either gene transfer or expressed gene products**
- **Reporters of pathway activation**

Imaging Modalities

- **Radioactive-based**
 - Gamma-ray Imaging
(Planar, SPECT, microSPECT)
 - Positron Emission Tomography (PET)
- **X-ray Computed Tomography (CT)**
- **Magnetic Resonance Imaging (MRI)**
 - Magnetic Resonance Spectroscopy (MRS)
- **Light-based (Optical) imaging**
 - fluorescence & bioluminescence
- **Ultrasonography (US)**

Human and Animal=X

Animal only=X*

	CT, US	MRI, MRS	PET	γ camera, SPECT	Optical
Anatomy					
Structure	X	X			X*
Blood flow	X	X	X	X	X*
Location of cells	X*	X*	X*	X	X*
Metabolism		X	X	X	X*
Receptors	X*	X*	X	X	X*
Molecular Signatures	X*	X*	X*	X*	X*

