



## Pathology & Biology Section – 2008

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### **G20 Sudden Cardiac Death in Professional Sports Persons: Natural vs. Anabolic Steroid Induced Lesions and Experimental Rabbit Model**

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This presentation will increase awareness of anabolic steroid-induced cardiac lesions in professional sports-persons and illustrate comparative lesions in the rabbit model.

This presentation will impact the forensic science community by demonstrating that because controlling or banning doping in professional sports is not feasible in the present state of affairs, treating with apoptosis inhibitors might hold out hope of limiting the incidence of severe evolutive cardiac lesions.

Out of 15,000 forensic autopsies performed on coroner's orders over a 24-year period (Jan 1981-Dec 2003) in the area of Lyon, France (population: 2,000,000), WHO criteria identified 2,250 cases of unexpected sudden cardiac death. Among these, 120 were found to have occurred during recreational sport and 12 in professional sports persons. In the latter category, the associated cardiac lesions were primitive: natural in 6 cases, and, according to inquest findings, induced by anabolic steroids in the other six. To shed light on the induced lesions, animal experiments were performed, administering Norethandrolone to rabbits which were then sacrificed and subjected to pathologic examination and caspase-3 assay by fluorometry on cardiac fragments.

The natural primitive lesions were classical for such cases. The anabolic steroid-induced lesions comprised coronary thrombosis associated with left ventricle hypertrophy and lesions analogous to toxic or adrenergic myocarditis. The same lesions were found, to varying degrees, in the rabbit models, which showed significantly elevated Caspase-3 activity as compared to controls.

Anabolic steroids would seem, to varying degrees, to induce lesions analogous to those found in myocardial pathology and toxic myocarditis. Their elevated Caspase-3 activity makes these lesions apoptotic in nature.

**Doping, Cardiac Lesions, Apoptosis**