

assessed by fluorometric assay. TUNEL assay was performed on atrial sections to identify cells undergoing apoptosis. Two-tailed paired *t*-test was used for statistical analysis. **Results:** In response to CPB, skeletal muscle samples did not show changes in total or modified apoptosis protein levels in response to CPB. In myocardial tissue, CBC significantly increased phosphorylation or cleavage of Bcl-2, Bad, or caspase 3, while there was no significant change in total protein levels. Bcl-2 (Ser70) and Bad (Ser112) phosphorylation were increased by  $2.35 \pm 0.40$  fold and  $1.64 \pm 0.25$  fold, respectively ( $p < .05$ ), while caspase 3 activity was increased  $1.50 \pm 0.14$  fold ( $p < .05$ ) after cardioplegic IR. The number of apoptotic cells in atrial tissue using TUNEL staining was increased following CBC/CA. Microarray analysis did not reveal any significant differential gene expression for the genes studied. **Conclusion:** Cold blood cardioplegic arrest triggers the modification/activation balance of both proapoptotic (caspase 3) and antiapoptotic (phospho-Bad and phospho-Bcl-2) proteins. This change is specific to myocardium as apoptosis cascade is not significantly altered following CPB in peripheral skeletal muscle. Moreover, protein activation rather than total protein levels may be the primary indicator of apoptosis induction in myocardium.

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### GENE EXPRESSION PROFILES FOLLOWING CARDIAC SURGERY IN DIABETIC PATIENTS AND THEIR CLINICAL CORRELATION.

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**Background:** Diabetes mellitus (DM) is an independent risk factor for complications following cardiac surgery. We examined peripheral gene expression and clinical responses to cardiopulmonary bypass (CPB) in patients with and without DM. **Methods:** Skeletal muscle was harvested from non-DM ( $n = 5$ ) and insulin-treated DM ( $n = 5$ ) patients before and after CPB. Oligonucleotide microarrays of 12,625 genes were performed on matched samples. Postoperative weight gain, systemic vascular resistance (SVR), temperature, and vasopressor requirements were determined. Nonparametric correlation analyses were used to examine clinical and gene expression relationships. **Results:** Mean CPB duration was  $77.5 \pm 4.0$  minutes. Compared to pre-CPB, peripheral tissue post-CPB revealed 626 up-regulated and 348 down-regulated genes in non-DM vs 420 up-regulated and 473 down-regulated genes in DM patients ( $p < .001$ ). Mean percent weight gain was  $4.5 \pm 1.4\%$ . Expression of TR3, a nuclear receptor that mediates vascular endothelial cell function, was shown to negatively correlate with percent weight gain. When compared to non-DM, patients with DM had greater weight gain ( $1.8\% \pm 0.56$  vs  $7.3 \pm 2.0\%$ , non-DM vs DM,  $p = .03$ ), which correlated with lower levels of TR3 expression (post/pre-CPB ratio  $7.6 \pm 3.3$  vs  $1.7 \pm 0.3$ , non-DM vs DM; Spearman's rank correlation  $r = -.68$ ,  $p = .03$ ). SVR, temperature, and vasopressor requirements were not significantly different in non-DM and DM. **Conclusions:** The gene expression profile following CPB is quantitatively and qualitatively different in diabetic patients. Clinical correlation suggests that differential TR3 expression is associated with postoperative weight gain, likely due to vascular endothelial dysfunction and tissue edema. These results have possible implications for the design of tailored operative strategies for diabetic patients undergoing CPB.

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### THE RELATIONSHIP BETWEEN CAFFEINE AND BLOOD PRESSURE IN PREADOLESCENT AFRICAN AMERICAN GIRLS.

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**Purpose:** While caffeine consumption has been shown to be associated with blood pressure (BP) elevation in controlled experiments, the relationship between caffeine consumption and higher BP levels in preadolescent (ages 6 to 11 years) and adolescent (ages 12 to 19 years) children consuming a regular diet has not been defined. The primary objective of this study was to assess the dose-response relationship between dietary caffeine intake and BP in 8- to 10-year-old African American girls consuming a regular diet. **Methods:** Demographic, three 24-hour dietary recalls, and BP data from 303 8- to 10-year-old African American girls in the Girls Health Enrichment Multisite Studies (GEMS) cohort were analyzed using linear and multiple regression models. **Results:** Dietary intake of caffeine was not associated with either systolic (SBP) or diastolic blood pressure (DBP) ( $p = .33$  and  $.36$ , respectively). However, consistent with the literature, height and body mass index were positively associated with SBP ( $p < .0001$  and  $p < .0001$ , respectively). Height and amount of sodium intake were positively associated with DBP ( $p = .01$  and  $p = .02$ , respectively). **Conclusions:** Dietary intake of caffeine is not associated with elevated BP in 8- to 10-year-old African American girls consuming a regular diet.

Variable	Univariate Analysis		Multivariate Analysis	
	Estimate*	p Value	Estimate*	p Value
Caffeine (mg)	0.04	.33		
Age (yr)	2.52	.0004	-0.26	.74
Height (cm)	0.46	< .0001	0.32	.0002
BMI (kg/m <sup>2</sup> )	0.78	< .0001	0.57	< .0001
Sodium (mg)	-0.00014	.84		

\*Univariate and multivariate estimates reflect the overall and adjusted difference in systolic blood pressure associated with a one-unit change in the variable of interest, respectively.

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### PLASMA EXTRACELLULAR SUPEROXIDE DISMUTASE IS DECREASED IN HIGH-ALTITUDE MOUNTAINEERS WHO ARE ENDURANCE TRAINED.

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**Purpose:** To measure plasma concentrations of extracellular superoxide dismutase (EC-SOD) in healthy mature athletes. **Methods:** Subjects were identified at the annual meeting of the American Alpine Club who were over age 40 and active in mountaineering. They completed a questionnaire describing their aerobic training when not on expeditions and their general health, a health status survey (SF-36), and had pulmonary function tests per-

formed. Blood samples were drawn and assayed for plasma EC-SOD using ELISA. A control group of similar-aged healthy subjects who were not selected for activity or interests was enrolled for comparison. Neither group reported a history of cardiovascular disease. **Summary:** The mean age of the mountaineer group was 52.7 years and the control group 55.7 years. Pulmonary function tests showed that the mountaineer group had a mean forced vital capacity as a percentage of predicted volume of  $105 \pm 3\%$  (mean  $\pm$  standard error of the mean) and forced expiratory volume in 1 second as a percentage of the predicted volume of  $101 \pm 3\%$ . Plasma EC-SOD concentrations were  $142.8 \pm 17.4$  ng/mL in the control group and  $22.4 \pm 2.56$  ng/mL in the mountaineer group ( $p < .001$ ). Looking at the mountaineer group alone and dividing them into an active (3 days per week of aerobic exercise) group and an extremely active (5 or more days per week of aerobic exercise) group the EC-SOD levels were  $27.2 \pm 3.4$  and  $17.6 \pm 3.4$  ( $t = 1.99$ ,  $p = .058$ ). **Conclusions:** EC-SOD is the primary catalytic antioxidant in the extracellular spaces and fluids. It scavenges superoxide and protects the vulnerable macromolecules of the extracellular matrix, such as collagen and proteoglycan, from oxidant damage. The majority of EC-SOD is bound to tissue and is in equilibrium with plasma levels. EC-SOD is highly expressed in the musculoskeletal tissues and exercise training has been shown to decrease plasma EC-SOD and raise tissue binding. Low EC-SOD plasma levels have been associated with a worse prognosis in cardiovascular disease but in the context of healthy, fit mountaineers may reflect the effect of increased tissue binding and better protection of the musculoskeletal system from oxidant injury. This is the first population study that has looked at plasma EC-SOD levels in relation to a group of individuals with a history of high-performance athletics and may provide insight into mechanisms of how exercise enhances function.

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### EPIDEMIOLOGY OF PLAYGROUND INJURIES IN AN URBAN SCHOOL SYSTEM

RESULTING IN EMERGENCY DEPARTMENT EVALUATION. L.M. Ryan, J.L. Wright, Children's National Medical Center, George Washington University School of Medicine and Health Sciences, Washington, DC.

**Background:** More than 200,000 children less than 15 years of age are treated per year in US emergency departments (ED) for playground-related injuries. The majority of such injuries occur on public playgrounds; most occur at schools. Most injuries occur when children fall from equipment onto the ground. Cost of care is estimated at \$7.5 billion annually. **Objective:** To characterize the epidemiology of ED-evaluated playground injuries occurring in an urban public school system. **Design/Methods:** All 168 schools in the 65,000 pupil District of Columbia public school system are supported by an on-site registered nurse. Clinical practice policy mandates that school nurses notify the ED at Children's National Medical Center (CNMC) for all students requiring emergency referral. Since 2003, referrals and associated ED treatment records are incorporated into a database to facilitate illness and injury surveillance and tracking. Injury data were analyzed for school year 2003-2004 to identify cases of playground injury. Descriptive epidemiologic and bivariate analysis was conducted. **Results:** During this period, 161 students, ages 3-19, were referred by a school nurse and evaluated at CNMC ED. Seventy-nine (49.1%) referrals were due to injury. Of injured students, 13 (16.4%) were playground related. The most common mechanism of injury was a fall from playground equipment (69.2%). Fractures (46.1%) and lacerations (30.7%) were the most common types of injury. All playground-related fractures were due to falls from monkey bars. The rate of fracture for playground-injured students (556/1,000 student-years) was significantly higher than the rates of fracture for all injured patients in the same age range seen in the CNMC ED during calendar year 2003 (134/1,000 patient-years, RR = 4.15, 95% CI 3.51-4.90). **Conclusion:** Fractures are overrepresented as an outcome of school playground injuries and are predominantly the result of falls from equipment. Opportunities for intervention should include further evaluation of urban school playground safety, including playground maintenance and injury patterns.

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### RELATIONSHIP BETWEEN PRIMARY CARE ACCESS AND PEDIATRIC INJURY AND POISONING: AN ANALYSIS OF THE 2003 NATIONAL HEALTH INTERVIEW SURVEY.

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**Background:** Primary care access is associated with better health and lower costs of care; its effect on injury risk has not been evaluated. Although not consistently demonstrated, positive outcomes associated with primary care injury counseling have been shown. The American Academy of Pediatrics identifies preventive counseling as a priority during well-child visits. Despite this, injuries remain the leading cause of pediatric morbidity and mortality. Is this an effect of inadequate access to primary care services? **Design/Methods:** Data from the Child Health Care Access and Utilization section of the Sample Child Core of the 2003 National Health Interview Survey (NHIS) were analyzed to identify children with limited access to primary care services. Access patterns were determined based on survey responses to indicators of primary care access: usual place of routine/preventive care, usual place of health care, and presence of unmet health care needs. Responses were categorized as limited, partially limited, not limited, and unmet needs. Using multiple logistic regression comparisons, the impact of these limitations on medically attended injury/poisoning rates was evaluated. An adjusted odds ratio of injury as a function of limited primary care access was obtained after controlling for confounders and demographic differences. **Results:** With control for gender, age, minority status, poverty, and medical insurance, no significant effect of primary care access limitations or presence of unmet health care needs was shown on the proportion of medically attended pediatric injury/poisoning episodes (Table 1). **Conclusions:** Primary care access, as a single variable, is not associated with a significant effect on medically attended injury/poisoning episodes in the pediatric population. Injury risk likely reflects multifactorial contributory circumstances and events.

TABLE 1 Odds Ratio of Injury and/or Poisoning Episode for Access Categories

Access Category	Odds Ratio	p Value	95% Confidence Interval
Limited	0.39	> .16	0.10-1.46
Partially limited	0.96	> .91	0.51-1.82
Unmet needs	1.15	> .61	0.68-1.93