

Journal of Andrology, Vol. 26, No. 1, January/February 2005
Copyright © [American Society of Andrology](#)

Activation of the Nuclear Factor Kappa B Pathway Following Ischemia-Reperfusion of the Murine Testis

JEFFREY J. LYSIAK^{*}, HYUN J. BANG^{*}, QUOC AN T. NGUYEN^{*} AND
TERRY T. TURNER^{*,†}

From the ^{*} Department of Urology and the [†] Department of Cell Biology,
University of Virginia Health System, Charlottesville, Virginia.

Correspondence to: Dr Jeffrey J. Lysiak, Department of Urology Box 800422,
University of Virginia Health System, Charlottesville, VA 22908 (e-mail: jl6n@virginia.edu).

Ischemia-reperfusion (IR) of the testis results in testicular oxidative stress and germ cell-specific apoptosis. Nuclear factor kappa B (NF- κ B) is a nuclear transcription factor involved in the control of a number of cellular processes, and its activation is part of the cellular stress response to a variety of factors including cytokine stimulation, irradiation, and IR. The present study investigates NF- κ B activation after IR of the murine testis and potential downstream target genes of that activation. Mice were subjected to a period of testicular ischemia followed by 0-4 hours of reperfusion. Activation of NF- κ B was assessed by 1) Western blot analysis of the NF- κ B inhibitory protein, I κ B α ; 2) immunohistochemistry for I κ B α ; and 3) TranSignal NF- κ B target gene array (107 genes) analysis. Results demonstrate that I κ B α is phosphorylated on serine 32 reaching a peak by 2 hours after IR of the testis. A decrease in total I κ B α was also noted at 2 hours after IR, consistent with the rapid degradation of the phosphorylated protein. Phosphorylation and degradation of I κ B α is indicative of NF- κ B activation. Immunolocalization revealed I κ B α specifically in Sertoli cells of the murine testis. Results of the TranSignal target gene array revealed that the expression of 9 genes was consistently changed 2 hours after IR of the testis, 3 of which increased in expression and 6 of which were down-regulated. Most notably, high-mobility group nucleosomal binding domain 1 increased in expression while platelet-derived growth factor B and Wilms tumor homolog decreased. These results suggest that testicular IR releases the suppression of NF- κ B by I κ B α in Sertoli cells. Activation of the NF- κ B pathway in the testis resulted in an alteration of expression of potential NF- κ B target genes, some increased while others decreased. The specific roles of these genes in the testicular response to IR remains to be determined.

Key words: Testicular oxidative stress, apoptosis, NF- κ B activation

This Article

- ▶ [Full Text](#)
- ▶ [Full Text \(PDF\)](#)
- ▶ [Alert me when this article is cited](#)
- ▶ [Alert me if a correction is posted](#)

Services

- ▶ [Similar articles in this journal](#)
- ▶ [Similar articles in PubMed](#)
- ▶ [Alert me to new issues of the journal](#)
- ▶ [Download to citation manager](#)

Citing Articles

- ▶ [Citing Articles via HighWire](#)
- ▶ [Citing Articles via Google Scholar](#)

Google Scholar

- ▶ [Articles by Lysiak, J. J.](#)
- ▶ [Articles by Turner, T. T.](#)
- ▶ [Search for Related Content](#)

PubMed

- ▶ [PubMed Citation](#)
- ▶ [Articles by Lysiak, J. J.](#)
- ▶ [Articles by Turner, T. T.](#)

This article has been cited by other articles:



T. T. Turner and J. J. Lysiak
Oxidative Stress: A Common Factor in Testicular Dysfunction
J Androl, September 1, 2008; 29(5): 488 - 498.

[\[Abstract\]](#) [\[Full Text\]](#) [\[PDF\]](#)



HUMAN REPRODUCTION

A. -N. Spiess, C. Feig, W. Schulze, F. Chalmel, H. Cappallo-Obermann, M. Primig, and C. Kirchhoff
Cross-platform gene expression signature of human spermatogenic failure reveals inflammatory-like response
Hum. Reprod., November 1, 2007; 22(11): 2936 - 2946.

[\[Abstract\]](#) [\[Full Text\]](#) [\[PDF\]](#)



BIOLOGY of REPRODUCTION

R. J. Rasoulpour and K. Boekelheide
NF-kappaB Activation Elicited by Ionizing Radiation Is Proapoptotic in Testis
Biol Reprod, February 1, 2007; 76(2): 279 - 285.

[\[Abstract\]](#) [\[Full Text\]](#) [\[PDF\]](#)



T. T. Turner, J. J. Lysiak, J. D. Shannon, Q. A. T. Nguyen, and C. R. Bazemore-Walker
Testicular Torsion Alters the Presence of Specific Proteins in the Mouse Testis as Well as the Phosphorylation Status of Specific Proteins
J Androl, March 1, 2006; 27(2): 285 - 293.

[\[Abstract\]](#) [\[Full Text\]](#) [\[PDF\]](#)