



# OxiDates

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## TBARS As A Biomarker In Wound Healing

The formation of post-operative adhesions and fibrosis in some patients who are prone to excessive peritoneal scarring can often have a serious effect on morbidity <sup>(1)</sup>. Adhesion fibroblasts develop a specific phenotype which may be highly sensitive to oxidative stress <sup>(2)</sup>. Such cells can produce inflammatory cytokine growth factors and extracellular matrix; ie, collagen-1, fibronectin, MMP-1, TGF-beta, and IL-10 <sup>(3)</sup>. During repeat operations this process can prolong operative time and increase the risk for complications <sup>(4)</sup>. It has been suggested that oxidative stress is a major factor in the etiology of wound healing, and antioxidant therapy is proposed to improve the healing of chronic wounds <sup>(5)</sup>. Adhesion formation is characterized by hemorrhage and localized hypoxia which provokes an inflammatory response leading to a rapid upregulation of various nuclear factors/cytokine growth and angiogenic factors, including coagulation and proliferation <sup>(6)</sup>. Peritoneal and dermal wound healing resemble each other with regard to tissue repair.

These reactions are synergistic and mediated in large part by products of lipid peroxidation <sup>(7)</sup>. Immunosuppression also exacerbates

lipid peroxidation and compromises antioxidant protection <sup>(8,9)</sup>. For example, the antioxidant enzyme activity of superoxide dismutase, catalase, and glutathione peroxidase may be decreased as much as 60-70 % within the first 2 days following surgery as it is being consumed in the repair process, and can remain below normal pre-operative activity for a period of 2 weeks <sup>(10)</sup>. During this time TBARS is elevated. The loss of antioxidant protection results in delayed healing.

Oxidants and antioxidants serve as messengers to drive the various pathways <sup>(11,12)</sup> and even mild alterations can trigger scarring <sup>(13,14)</sup>. Increased lipid peroxidation influences fibroblast proliferation and collagen deposition at the site of injury <sup>(15)</sup>. It is interesting that antioxidant bioflavonoids can improve wound healing <sup>(16)</sup>.

TBARS has been used in several reports to monitor the rate of cellular repair and prognosis <sup>(8-10,15)</sup>. The OxiTek kit is a convenient, cost effective bioassay to follow the dynamics of wound healing especially in diabetic glomerulosclerosis and in the elderly <sup>(17)</sup>.

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