The *in vitro* formation of ROS/RNS is inhibited by polihexanide

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Introduction

Wound dressings combined with antimicrobial agents are increasingly utilized in the treatment of critical colonized or infected chronic wounds. Polihexanide (fig. 1) is regarded first choice for chronic wounds because of its good skin tolerance beside its antimicrobial effects. An additional anti-oxidative effect would be a beneficial attribute of polihexanide as exudates of chronic wounds contain elevated levels of reactive oxygen and nitrogen species (ROS/RNS) [1].

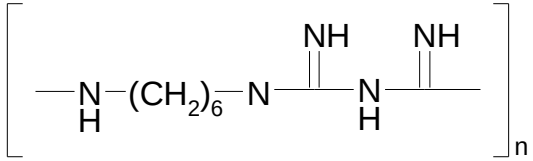

Fig. 1: Structure of polihexanide

Material & Methods

Antioxidant potential of polihexanide (Cosmocil®, ARCH Chemicals) and a HydroBalanced wound dressing with PHMB (Suprasorb® X+PHMB, Lohmann & Rauscher) was measured using the chemiluminescent ABEL® Antioxidant Test Kits containing Pholasin® specific for superoxide and peroxynitrite (Knight Scientific Limited).

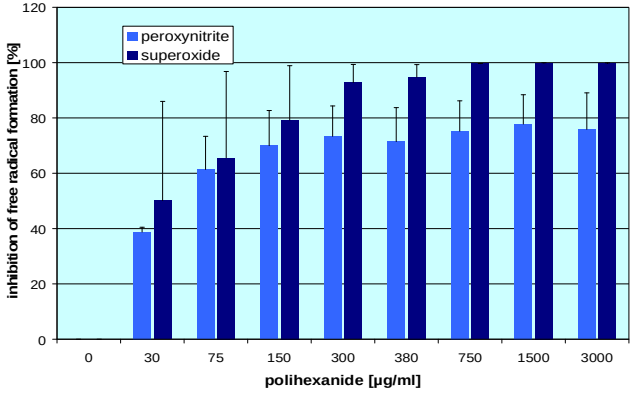

Fig. 2: Inhibition of the formation of ROS and RNS by polihexanide.

Results

Polihexanide exhibited a significant concentration dependent antioxidant potential (fig. 2). The wound dressing containing polihexanide was also able to inhibit the formation of ROS and RNS significantly (fig 3).

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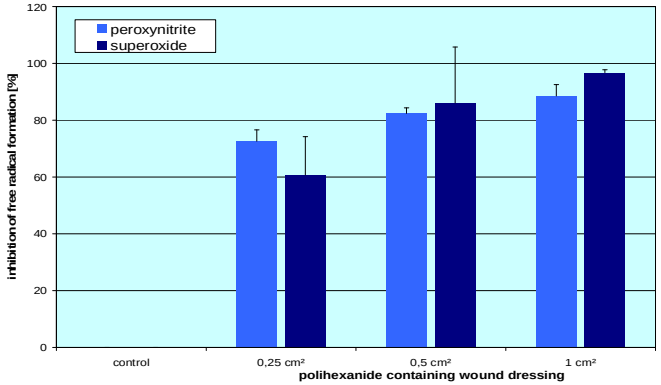

Fig. 3: Scavenging of free radicals by a wound dressing containing polihexanide (mean ± SE)

Conclusions

It is believed, that the overproduction of reactive nitrogen and oxygen species in chronic wounds (fig. 4) results in an elongated inflammatory phase and severe tissue damage [2]. Hence, the reduction of these active species seems to be a suitable way to promote normal wound-healing. Polihexanide inhibits the formation of free radicals *in vitro*. Therefore, polihexanide as well as the biocellulose wound dressing containing polihexanide should have an auxiliary influence on the healing of chronic wounds beside the anti-microbial effect.

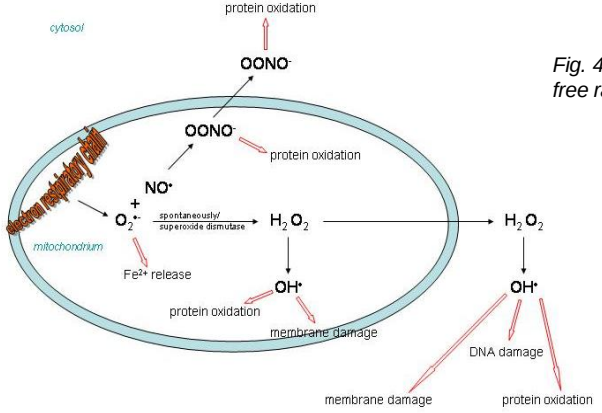

Fig. 4: Schematic representation of free radical formation in the cell

References

1. *Moseley R. et al. Comparison of oxidative stress biomarker profiles between acute and chronic wound environments. Wound Rep Reg 2004; 12:419-29*
2. *Moseley R. et al. Comparison of the antioxidant properties of HYAFF-11p75 AQUACEL and hyaluronan towards reactive oxygen species in vitro. Biomaterials 2002; 23:2255-64*