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Joseph D Lichtenhan

Hybrid Plastics Inc., USA

Hemostasis with POSS® silanols

Statement of the Problem: A single "perfect" hemostat cannot exist due to the wide range of injury types experienced by humans and animals. However, a leapfrog advancement in hemostatic devices is desperately needed to address noncompressible hemorrhagic bleeding. More specifically, injuries to arteries in the neck, internal organs, or groin require immediate surgical attention because these types of hemorrhages do not adequately respond to compression or packing. Despite extensive and admirable work to increase blood clotting rates, the clotting cascade alone doesn't react fast enough, in these types of injuries, to arrest fluid loss from an artery. While hemorrhagic bleeding is often associated with battlefield trauma or acts of terrorism, uncontrolled hemorrhages can also occur in a wide range of incidences, ranging from automobile and plane accidents to recreational and home repair accidents. Nearly all hemorrhagic bleeding is initially addressed by a first responder who may or may not have any or adequate medical training for such trauma. Therefore, one of the first requirements for developing a hemostat that works on noncompressible bleeding is for it to have high deployability and intuitive application. This would be analogous to use of a fire extinguisher "point at the base of flame and squeeze handle". Next, the hemostatic agent needs to be proliferative, meaning that it is capable of translating within the wound channel to the source of the hemorrhage, even if it is not visible. Finally, the hemostatic agent must be effective without compression. This latter point is critical considering that only minor amounts of compression may be possible for the neck, internal organ, and groin hemorrhage. POSS additives are known to enhance medical and personal care products and have been in the UK and US markets for several years. In particular, a liquid trisilanol hepta-iso-octyl POSS is uniquely well suited for use as a hemostatic device for non-compressible bleeding. Upon contact with blood trisilanol, hepta-iso-octyl POSS rapidly prevents fluid loss and simultaneously forms a viscoelastic polymeric clot (thrombus) with blood components. The mechanism of action for the POSS viscoelastic hemostat, along with its comparative performance relative to other hemostatic devices will be presented. This presentation will include *in vitro* and *in vivo* findings.

Biography

Joseph D Lichtenhan, Ph.D. Is a co-founder of Hybrid Plastics Inc. Dr. Lichtenhan is a pioneer and world authority in the field of POSS® additives. POSS has been hailed as the first entirely new chemical class of monomers to be developed since 1955. His insights into their commercial utility launched the global sales for POSS® in 1998. Dr. Lichtenhan has excelled at technology transition and the establishment of a global footprint for POSS® via innovative sales and marketing techniques.

lichtenhan@hybridplastics.com

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