

Host response to UHMWPE wear debris

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13600 citations, Hirsch 51
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POLYETHYLENE: PRO



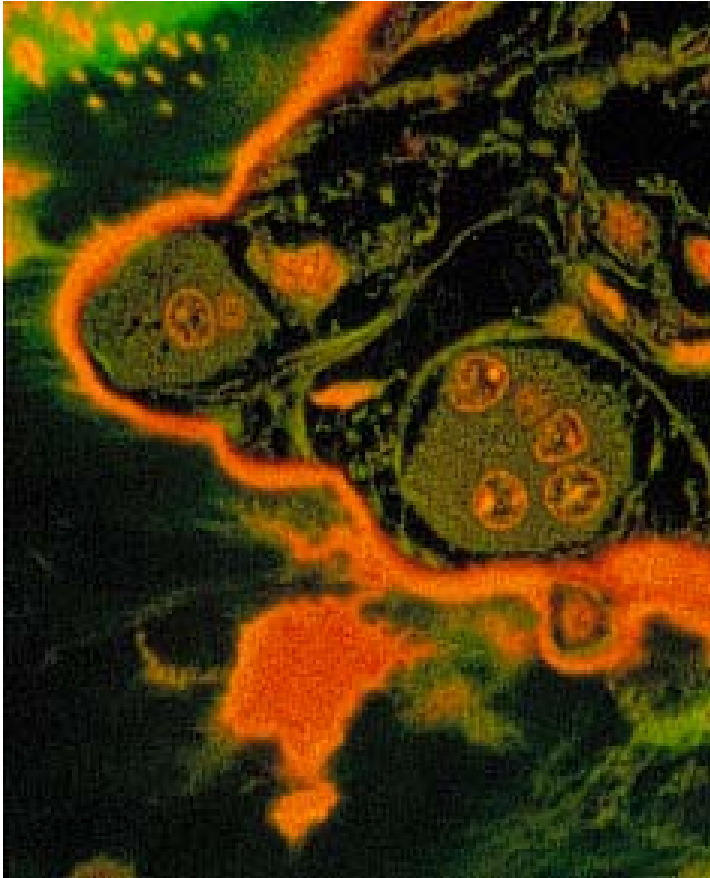
- Golden standard
- Mechanical properties
- Tribology
- Molded, machined
- Shock absorber
- Tolerated edge loads
- Forgiving
- Affordable

POLYETHYLENE: CON



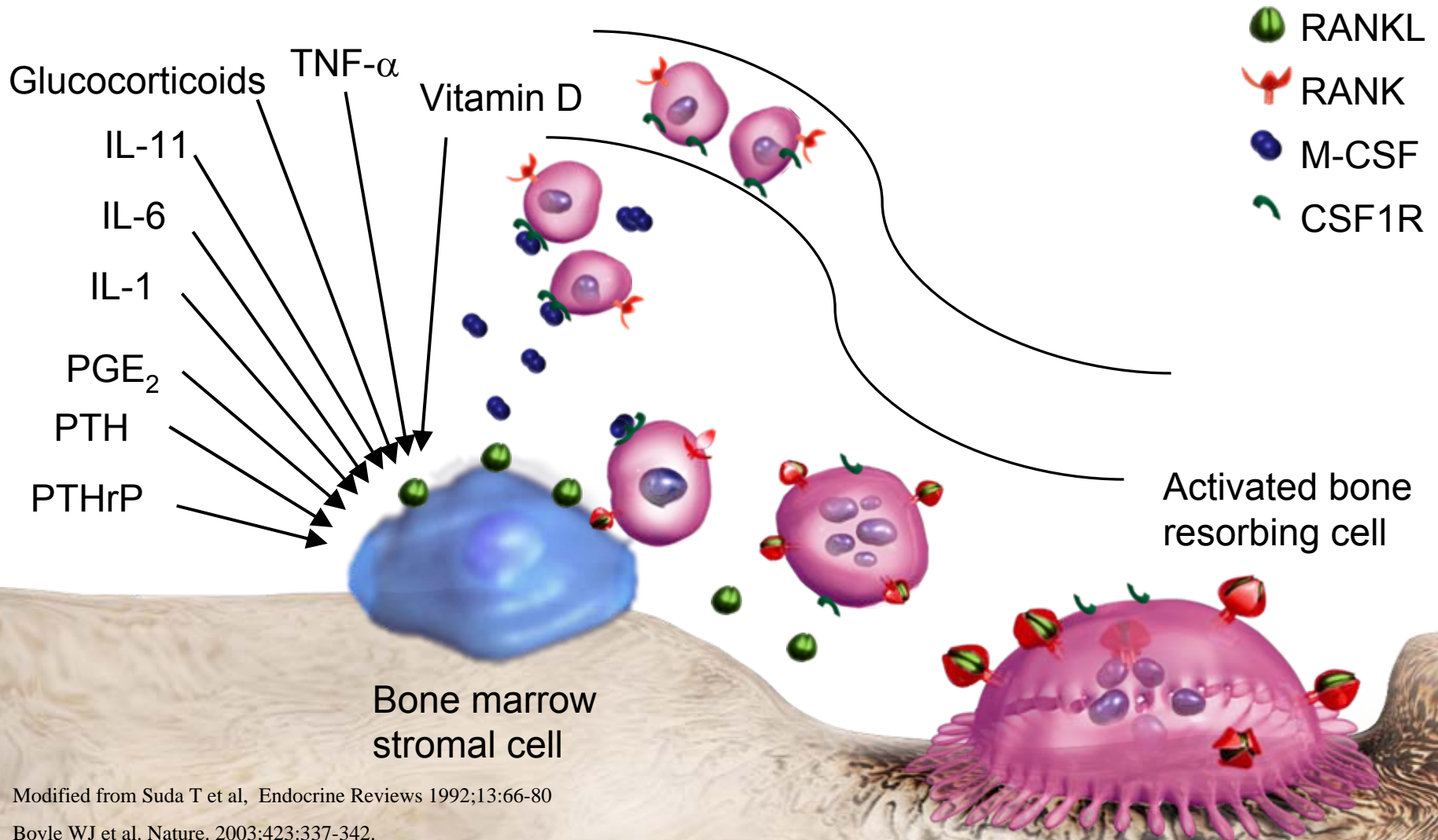
- Wear particles - their disposal is a problem
- Oxidative stress – binding to scavenger MARCO & Toll-like receptors/ TLRs?
(Maitra)
- Fracture

CELLULAR CONSEQUENCES



- Phagocytosis
- Failure to digest
- Recruitment of cells
- Activation of resident cells
- Foreign body giant cells/granulomas
- Osteoclasts/peri-implant osteolysis

MOLECULAR CONSEQUENCES



Modified from Suda T et al, Endocrine Reviews 1992;13:66-80

Boyle WJ et al. Nature. 2003;423:337-342.

AVOIDANCE OF WEAR



Other sources: asparagus, milk, eggs, palm oil, seed, vegetable oils, wheat germ

- State of the art
- Wear - crosslinking - oxidative stress
- → annealing and/or remelting - microstructure & mechanical properties
- Addition of minute amounts of vitamin E

FUTURE



- **Biocomp/design**: ions, nanoparticles (Slouf), TLRs (in press), effects on cells other than macrophages (Musib), microbes (Barrena)
- **Impl./ team/ rehab**
- **Patient/individualized med./ takes two to tango** (Cody Bunger)