

Evaluation of effects of natural and synthetic compounds *in vitro* and *in vivo*

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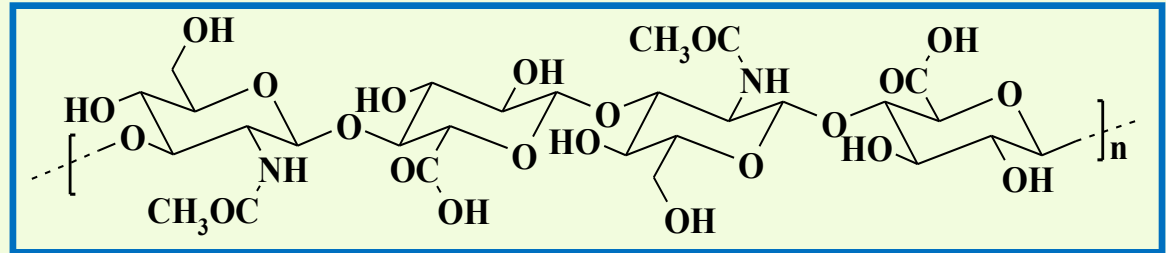
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Annotation

Hyaluronan (HA), a polysaccharide of molecular weight of several megaDaltons, is present in all tissues of vertebrates. In inflammatory diseases the average molecular weight of hyaluronan is significantly decreased by action of reactive oxygen species.

The solutions of hyaluronan of high molecular weight will be exposed to free radicals and oxidants in *in vitro* studies. Further, protective effects of antioxidants/drugs to prevent and chain-breaking degradation of HA will be examined. The compounds, which will function as antioxidants against *in situ* degradation of HA will be examined against *in vivo* in skin wounds of ischemic rabbits.

Hyaluronan

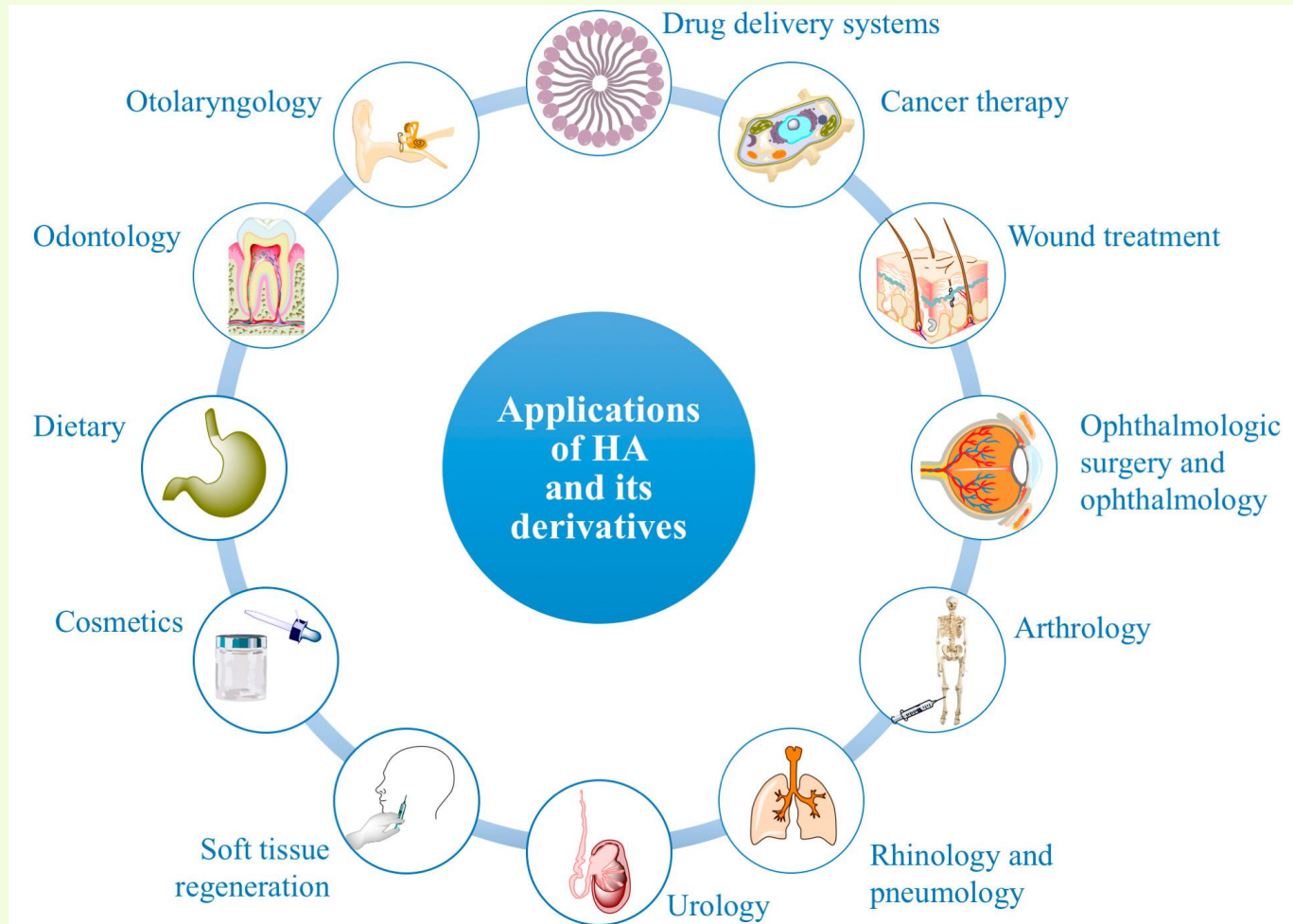


Linear polysaccharide of molar mass $M_w = 7 \times 10^6$ Da

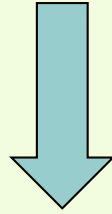
The highest HA occurrence:

- Skin
- Eyes
- Umbilical cord

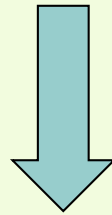
Applications of hyaluronan



Exposition of hyaluronan
to Cu(II) ions and ascorbate



•OH radicals
Alkoxy-/peroxy-type radicals



Hyaluronan degradation and fragmentation

Assessment of antioxidative effect of:

- Mn(III) porphyrins
- Substances with a thiol group
- Micronutrients of cocoa

Methods

Rotational viscometry

The examined compounds will be assessed as:

- donors of H•
- sequestors of transition metal ions

Oxymetry

- consumption of oxygen in HA solutions

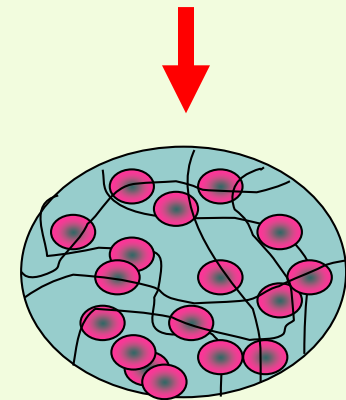
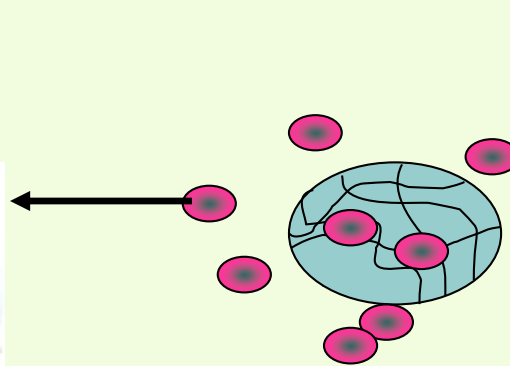
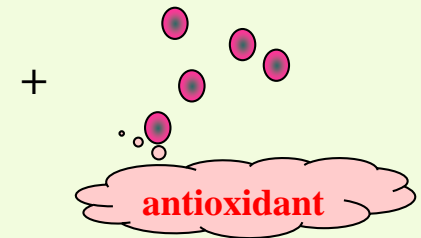
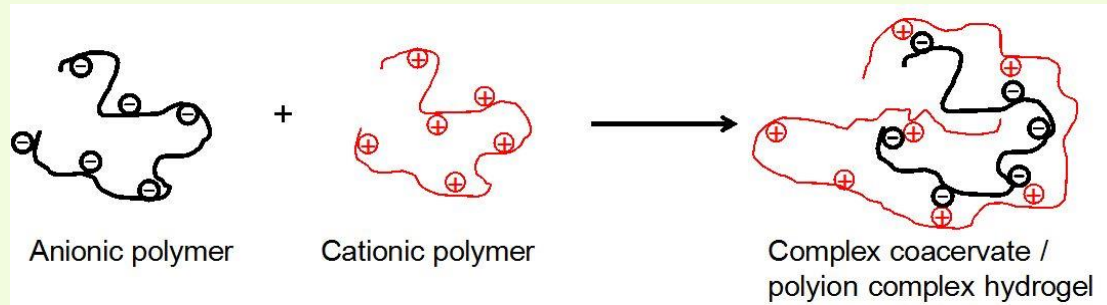
ABTS and DPPH assays

- radical scavenging capacity of antioxidants/drugs
- donors of electrons

Electron paramagnetic resonance

- detection of scavenging of reactive oxygen species by assessed antioxidants/drugs

Skin wound healing



Biomembrane + antioxidant

Healing of wounds in ischemic rabbits