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Hyaluronan Biosynthesis

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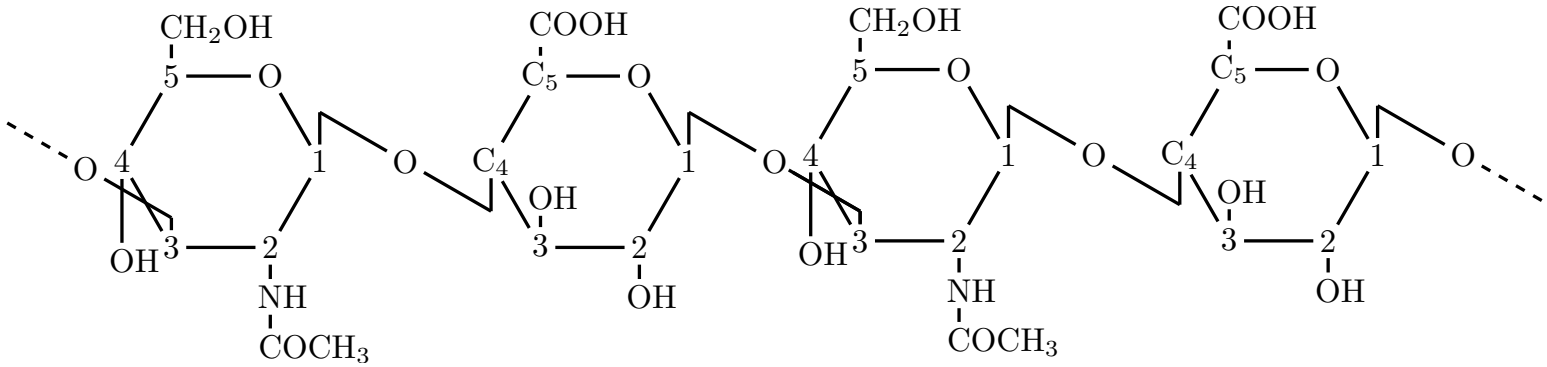

Figure 1: Chemical structure of hyaluronan.

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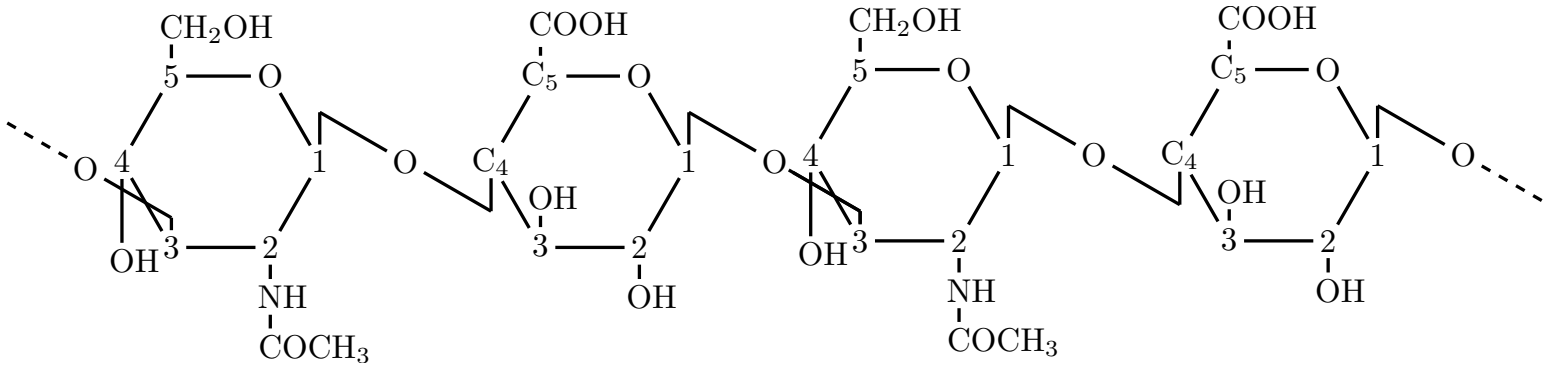

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- Polymer degree: very high (up to 25000 disaccharide units).
- Be able to exist in numerous form of sizes.

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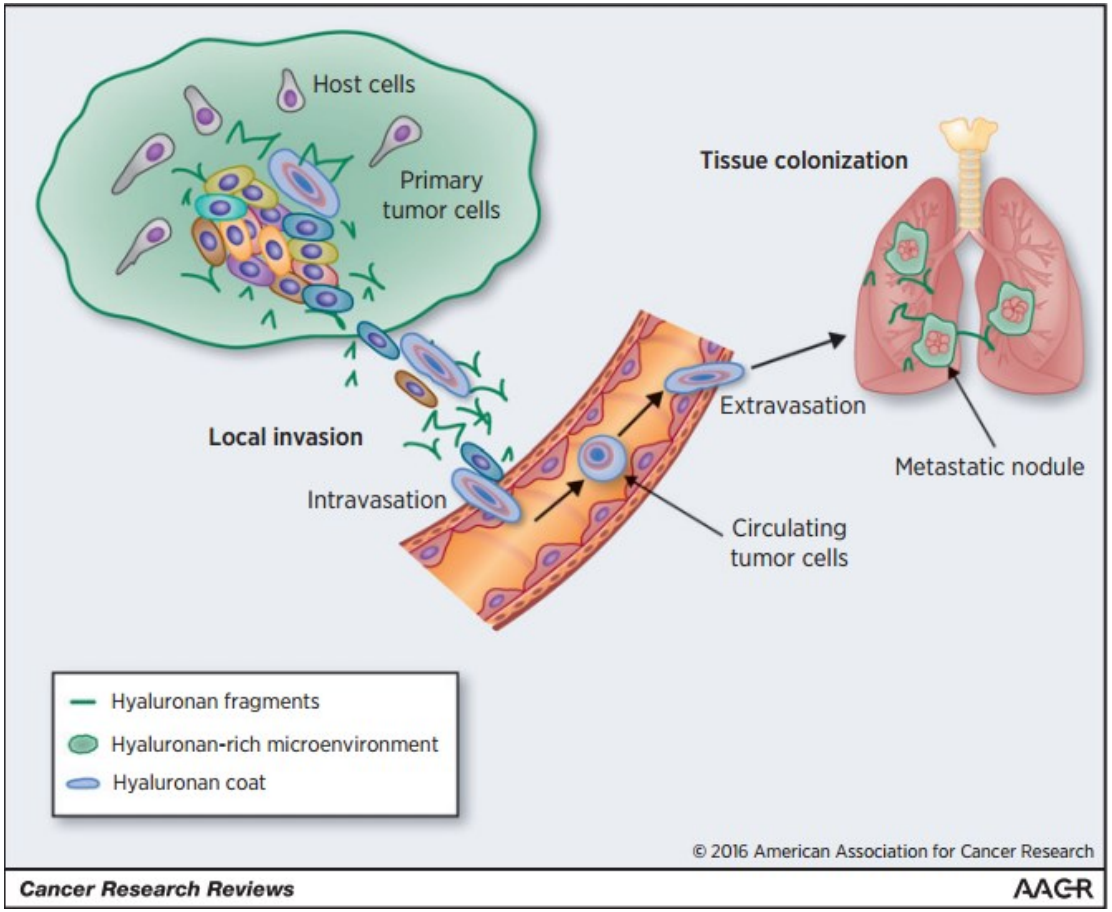

Figure 2: Diagram of the stages of tumorigenesis that require HA pericellular matrices and fragments.

Figure 3: Naked mole rat in a zoo.

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It can be resistant to cancer due to its fibroblasts secret extremely HMW-HA which is over five times larger than human and mouse HA.

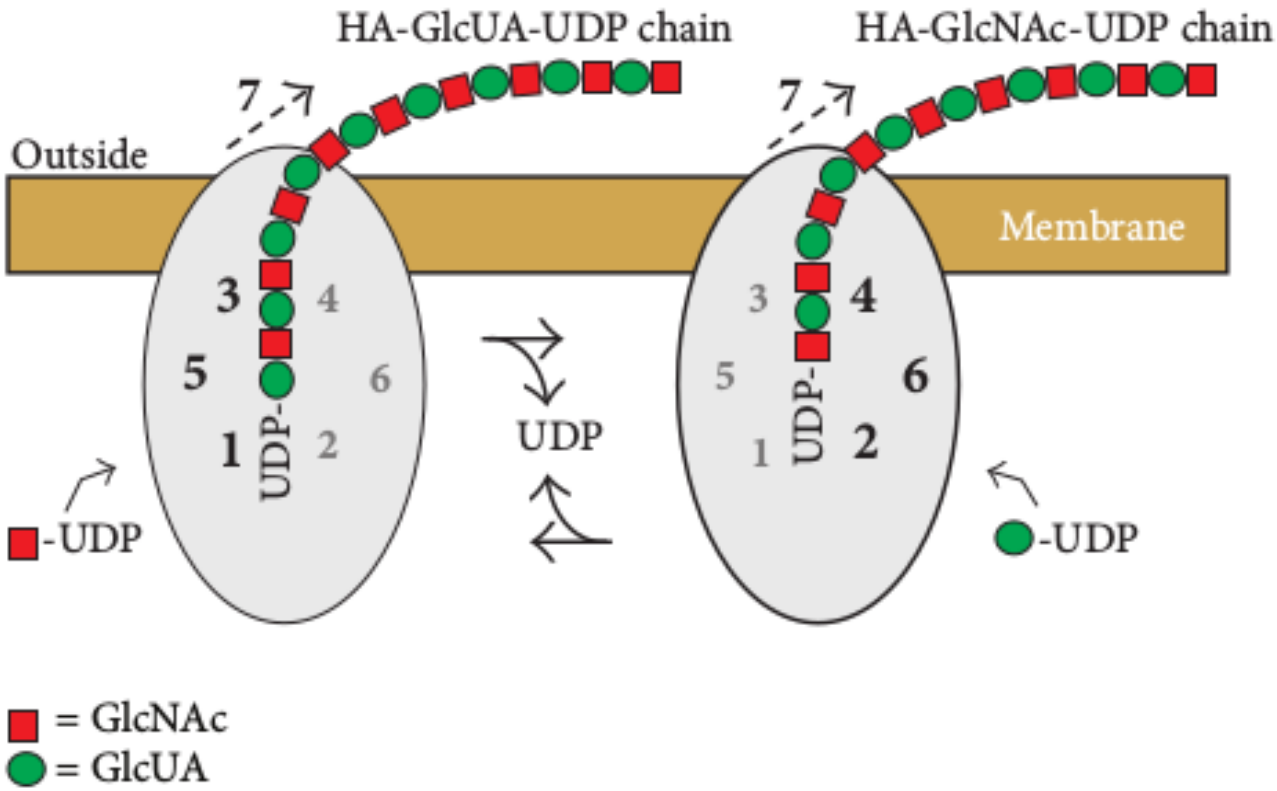

Figure 4: Schematic model of HA synthases showing the functions needed for HA chain growth at the reducing end and transfer to the cell surface.

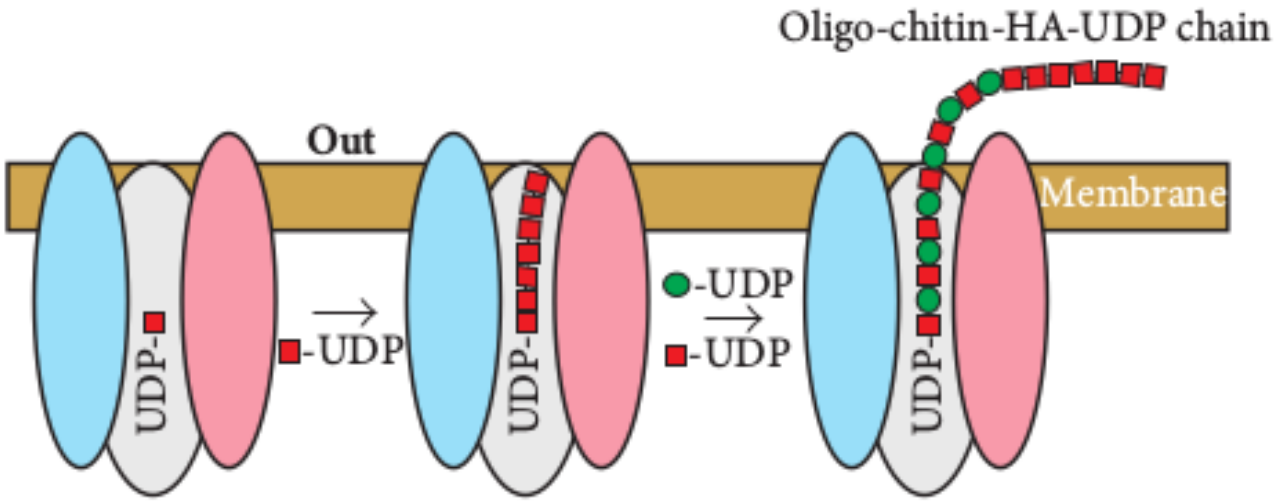

Figure 5: HAS initiation of HA synthesis using a self-made oligochitosyl-UDP primers results in HA chains with a chitin oligosaccharide cap at the non-reducing end.

Questions

1/ What about the concentrations of UDP-sugars?
2/ How do cells turn HA synthesis on?
3/ Why would we like to model the HA synthesis?

Figure links

Figure 2: *https* : *//en.wikipedia.org/wiki/Naked*$_m$*ole* − *rat*
Figure 3, 4: adapted from [4].
Figure 5: *https* :
*//pubchem.ncbi.nlm.nih.gov/compound/*25202620#*section* = *Top*
Figure 6: *https* :
//en.wikipedia.org/wiki/Uridine_diphosphate_N − *acetylglucosamine*

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[3] Nermeen S. El-Safory, Ahmed E. Fazary, Chang-Kang Lee: *Hyaluronidase, a group of glycosidases: Current and foture perspectives*. Carbohydrate Polymers 81 (2010) 165-181.
[4] Paul H. Weigel: *Hyaluronan Synthase: The Mechanism of Initiation at the Reducing End and a Pendulum Model for Polysaccharide Translocation to the Cell Exterior*. International Journal of Cell Biology 2015, 15 pages.
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