

# Background Information on Wharton's Jelly and Umbilical cord blood stem cells with respect to current FDA regulations.

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## I. Etymology:

- a. Medical term for Wharton's jelly is *substantia gelatinae funiculi umbilicalis* is a gelatinous substance within the [umbilical cord](#),<sup>[1]</sup>
- b. and is derived from extra-embryonic [mesoderm](#).
- c. Named after English physician and anatomist, Dr. Thomas Wharton is 1656.

## II. Gross anatomical description:

- a. Gelatinous substance within the umbilical cord
- b. Largely made up of mucopolysaccharides
- c. Mucous connective tissue
- d. Gross function is to protect the umbilical artery and vein

## III. Microscopic description and function:

- a. largely made up of [mucopolysaccharides](#) ([hyaluronic acid](#) and [chondroitin sulfate](#)).
- b. some [fibroblasts](#) and [macrophages](#),
- c. Mesenchymal stem cells
- d. Wharton's jelly-derived mesenchymal stem cells may have immunomodulatory effect on lymphocytes.<sup>[5]</sup>
- e. Mesenchymal stem cells (MSCs) are derived from the mesoderm and have self-renewal and multi-differentiation capacity.
- f. Under appropriate conditions *in vivo* and *in vitro*, they can differentiate into various tissue cells, such as osteoblasts, chondrocytes, adipocytes, muscle cells, and neurocytes ([1-7](#)).
- g. For these reasons, MSCs are considered important seed cells for tissue engineering and cell transplantation.

h. The human umbilical cord Wharton's jelly provides a source of MSCs that exhibit a high degree of self-renewal capacity and multi-differentiation potential.

i. Connective tissue

**IV. Important to know with respect to FDA regulations:**

a. These cells regardless of placental tissue source (amnion, cord, and cord blood) can mediate at least some of the immune tolerance properties of the placenta.

b. The placenta, umbilical cord and amnion in a normal state function to immunoprotect and modulate such that the baby is not rejected by the mother. This "homologous use" is why I think transfusing cells and matrix from Wharton's jelly and umbilical cord blood stem cells is acceptable to help patients, and should be considered only "minimally manipulated tissue" for "homologous use" used to "repair, reconstruct, replace or supplement."