

## Research and Development Request

<b>Title</b>	<b>A matrix for controlled release of chemicals for cell-based regenerative therapies of osteoarthritis</b>
<b>Summary</b>	Aside from surgery, injectable regenerative therapies stand as a viable option in the treatment of osteoarthritis. Since cartilage is avascular, intra-articular therapies have the potential to improve the efficacy of the formulation that is to be injected. Hyaluronic acid (HA) is a carbohydrate, more specifically, a mucopolysaccharide, that occurs naturally in all living organisms. HA is biocompatible, biodegradable, and mucoadhesive, and is involved in many key processes such as cell signaling, wound repair, tissue regeneration, morphogenesis, matrix organization, and pathobiology. It is naturally negatively-charged due to the carboxylate groups and it can form a highly viscous gel. We propose a matrix that is composed of human-based, crosslinked hyaluronic acid (HA) to tune the diffusion of chemicals/drugs/cells from the injectable. We aim at isolating HA from Wharton's jelly to access high-quality and abundant HA.
<b>Advantages and Innovations</b>	The abundance of HA in Wharton's jelly will enable the production of high-quality HA in higher amounts compared to other sources.
<b>Stage of Development</b>	<input checked="" type="checkbox"/> Under development / lab tested
<b>Description</b>	<p>Currently the consortium is composed of a SME and a University from Turkey. The SME, which is the first cord blood and stem cell bank in Turkey, conserves approximately 4000 processed cord blood samples. The company has one of the highest numbers of transplantation of cord blood for stem cell treatments of blood-related diseases globally. In addition to the regular cord blood banking, the firm focuses on intensive research and development on cell therapy such as personal tissue regeneration and the development of pharmaceutical biotechnology products. The firm has the state-of-the-art facilities to collect, store, and process bone marrow, endometrium, and adipose tissue-derived mesenchymal stem cells and process chondrocytes, fibroblasts, and melanocytes as well as to obtain HA from the Wharton's jelly.</p> <p>Turkish University is one of the top research-focused universities in Turkey with significant experience in industrial projects. They will be carrying out the matrix design and optimization of the formulation of materials along with the partners. One of the most important drawbacks of cell-based injectables are the exposure of cells to an overdose of chemicals. In the proposed matrix, diffusion will be controlled via the amount of crosslinking in the system. The system will facilitate the preparation of patient-specific formulations as well. The cosmetic applications of HA are also in the scope of the project.</p>

	<p>The proposal is being prepared for the IraSME call. Countries participating in this call are: Alberta (Canada), Austria, Brazil, Flanders (Belgium), Germany, Luxembourg, Russia, Turkey, and Wallonia (Belgium)</p> <p>For more information on the call you can visit the Call Website: <a href="https://www.ira-sme.net/current-call/">https://www.ira-sme.net/current-call/</a></p> <p><b>Deadline of the Call:</b> 31st March 2021</p> <p><b>Deadline of EOIs:</b> 1st February 2021</p> <p><b>Partners Sought:</b> SME and R&amp;D Institutions who can support the consortium with purification of hyaluronic acid; quantification of the amount of chemicals and hyaluronan in Wharton's jelly and pegylation of hyaluronic acid are being sought.</p> <p><b>References:</b></p> <ul style="list-style-type: none"> <li>• Lago, G., Oruña, L., Cremata, J. A., Pérez, C., Coto, G., Lauzan, E., &amp; Kennedy, J. F. (2005). Isolation, purification and characterization of hyaluronan from human umbilical cord residues. <i>Carbohydrate Polymers</i>, 62(4), 321-326.</li> <li>• Weissmann, B., &amp; Meyer, K. (1954). The structure of hyalobiuronic acid and of hyaluronic acid from umbilical cord. <i>Journal of the American Chemical Society</i>, 76(7), 1753-1757.</li> <li>• Rosa, C. S. D., Tovar, A. F., Mourão, P., Pereira, R., Barreto, P., &amp; Beirão, L. H. (2012). Purification and characterization of hyaluronic acid from chicken combs. <i>Ciência Rural</i>, 42(9), 1682-1687.</li> <li>• Shimojo, A. A. M., de Souza Brissac, I. C., Pina, L. M., Lambert, C. S., &amp; Santana, M. H. A. (2015). Sterilization of auto-crosslinked hyaluronic acid scaffolds structured in microparticles and sponges. <i>Biomedical Materials and Engineering</i>, 26(3-4), 183-191.</li> <li>• Murado, M. A., Montemayor, M. I., Cabo, M. L., Vázquez, J. A., &amp; González, M. P. (2012). Optimization of extraction and purification process of hyaluronic acid from fish eyeball. <i>Food and Bioproducts Processing</i>, 90(3), 491-498.</li> </ul>
<b>Technology Keywords *</b>	Hyaluronic acid, controlled release, osteoarthritis, mesenchymal stem cells, chondrocytes
<b>Market Keywords *</b>	Injectable, knee injections, osteoarthritis, cell-based therapy
<b>Responsible *</b>	In Merlin, select who from your organisation will be responsible for this profile-
<b>Sector Group</b>	<input checked="" type="checkbox"/> Bio Chem Tech <input checked="" type="checkbox"/> Healthcare <input checked="" type="checkbox"/> Nano – and Microtechnologies

<b>Type and Size of Client *</b>	<input checked="" type="checkbox"/> Industry SME 11-49 <input checked="" type="checkbox"/> University
<b>NACE keywords *</b>	M. 72.1.1 Research and experimental development on biotechnology  M. 72.1.9 Other research and experimental development on natural sciences and engineering
<b>Languages Spoken *</b>	English, Turkish
<b>Type and Role of Partner Sought</b>	SMEs and R&D Institution from the Call participating Countries (Alberta (Canada), Austria, Brazil, Flanders (Belgium), Germany, Luxembourg, Russia, Turkey, and Wallonia (Belgium) for the following roles:  Partners who can support the consortium with <ul style="list-style-type: none"> <li>i) purification of hyaluronic acid (e.g., through distillation and chromatography) and</li> <li>ii) quantification of the amount of chemicals (e.g., proteoglycans and growth factors) and hyaluronan in Wharton's jelly,</li> <li>iii) pegylation of hyaluronic acid</li> </ul>
<b>Type and Size of Partner Sought</b>  <b>Note: Multiple fields can be selected.</b>	<input checked="" type="checkbox"/> SME < 10 ** <input checked="" type="checkbox"/> SME 11-50 ** <input checked="" type="checkbox"/> SME 51 – 250 ** <input type="checkbox"/> 251-500 ** <input type="checkbox"/> >500 ** <input type="checkbox"/> MNE >500 <input type="checkbox"/> Inventor <input checked="" type="checkbox"/> R&D institution <input type="checkbox"/> University
<b>Type of Partnership Considered *</b>	<input checked="" type="checkbox"/> Research cooperation agreement
<b>Framework Programme *</b>	IraSME
<b>Call Name *</b>	27th Call for Proposals
<b>Anticipated Project Budget</b>	250.000 euros

<b>Deadline for Call *</b>	31/03/2021
<b>Deadline for Expression of Interest *</b>	01/02/2021
<b>Project Duration</b>	2 years
<b>Weblink to the Call</b>	<a href="https://www.ira-sme.net/current-call/">https://www.ira-sme.net/current-call/</a>