Team name: miR-based Therapy
Date updated: October 2019

S1: Title & Elevator Pitch/Headline	*Type I diabetes is now managed using lifelong insulin injections and it has no cure. Although promising, Regenerative Therapies are showing a number of limitations and therefore, narrow success on this disease. Based on our novel microRNA-based technology, we offer **MImoPancreas:** an encouraging solution to those issues, that will revolutionize the current state-of-the-art for pancreatic cell replacement.*
S2: The problem	• Diabetes is the major cause of blindness, kidney failure, heart attack and stroke. The number of people affected by all types of diabetic disorders is now over four times higher than just 40 years ago. This has led the **World Health Organization to consider diabetes an epidemic,** predicting it will soon be the seventh biggest cause of death worldwide. • Despite its huge impact, there is **still no cure** for any type of diabetes. Most treatments help patients manage the symptoms to a certain extent, but diabetics still face multiple long-term health complications. • Huge **emotional and economic burden** are associated with this disease.
S3-S4: Competing approaches	• The market size in Diabetes is outstanding and the expected growth is about 4% CAGR in the next few years. As a promise for the near future, Advanced Regenerative Therapies for T1D are currently under development by several companies. • Current competitive market is trying to develop the technology to: (i) obtain de stem cells, (ESCs, IPSCs); (ii) differentiate them to pancreatic cells; (iii) include them in a particular device that allows free traffic of glucose/insulin but does not permit the entry of immune cells (thus avoiding the immune attack). A number of companies are developing such strategy, at different levels. • Some of those companies are devoted to improve the cells and some others, to improve the encapsulation devices. • However, the success is still limited by the insufficient potential of stem cells to (i) survive under challenging conditions; (ii) differentiate and maturate to be functional; (iii) maintain those properties in the long-term.
S5: The solution	• Our technology will overcome the current issues. We offer a suitable methodology to significantly improve the **stem potential** of the initial material**, their survival and their capacity to specialize** into pancreatic **mature and functional** cells.
S6-S7: The product	• We are intended to be **not only better but different** from our competitors: our novel product, **MimoPancreas**, is much more than a cluster of cells, but a self-organized tridimensional structure that accomplishes different pancreatic cell types together, working together for a more efficient outcome. Interestingly enough, **MimoPancreas** are created **from pancreatic progenitors** (avoiding concerns about pluripotency of ESCs/IPSCs). • miR-based technology makes them mature, functional and stable. • **Our vision: Long-life restoration of blood glucose control.**
S8-S9: Technology	• Our technology has been successfully tested (i) in multiple applications and (ii) by several collaborators all over the world for several years. • The mechanism of action is epigenetic. The miRNA erases transiently and reversibly the DNA methylation, in a manageable way, to promote better differentiation outcomes afterwards. • The microRNA, transiently applied to patient-derived **or allogenic** pancreatic progenitors, will make them more proficient to differentiate in vitro, therefore developing the MimoPancreas to be implanted back for cell replacement.

S10: our strategic alliances	• The companies **devoted to perfectionate the encapsulation will be potential partners** to approach. Together, **we will establish strategic alliances** to efficiently compete with the rest of the market.
S11: a mitigation alternative	• Our plan for **building value** includes translating our observations to human cells and validate the functionality of our MImoPancreas in vivo, using diabetes animal models. • Current work in our laboratory also suggests an interesting alternative approach, delivering in situ the miRNA at early stages of the disease, to impulse pancreatic cell regeneration. This would be our mitigation alternative.
S12: Traction and team	• Our team has a track of more than 200 publications; 10 book chapters; more than 20.000 citations; 2 patents; more than 90 invitations to conferences in international institutions. • **María Salazar-Roa**, project manager. Staff scientist at CNIO. More than 6 years of experience in stem cell biology, cell proliferation and differentiation. 37 articles (9 as first author, 2 as corresponding author); more than 8.000 citations; h-index of 25; one patent directly related to the asset; awarded by MIT (Boston, US) and Caixa (Barcelona, Spain) to participate in *IDEA2 Global 2019* and *CaixaImpulse 2019* valorization and mentorship programs. • **Carolina Pola**, expert in technology transfer and innovation. Director of Innovation and International Affairs at CNIO. More than 10 years of experience in technology transfer; scientific editor in Nature Medicine; scientific director in Nature; director of Corporate and Scientific Communications at PharmaMar. • **Marcos Malumbres**, scientific advisor. Head of Cell Division and Cancer laboratory at CNIO. More than 10 years of experience in cell cycle studies, cell proliferation and differentiation. More than 200 publications, 10 book chapters; more than 20.000 citations; 2 patents. • **Carolina Villarroya** (postdoctoral), **Nuria García** (full-time PhD student) and **Aicha ElBakkali** (part-time technician) will participate actively in the project. • Our advisory board (**Petra Krauledat, Peter Bryant, José Luis Cabero, Sotirios Karathanasis**) mentors and monitors periodically our progress.
S13: Closing	• Despite its huge impact, there is still no cure for any type of diabetes. • The biotech industry has seen this opportunity and is striving to develop new diabetes treatments and **chasing the holy grail: a cure**. The diabetes market is expected to **reach a massively big €86Bn by 2025** combining both type 1 and type 2, and we can expect all sorts of revolutionary technologies to come forward and claim their market share. • **The cell therapy on T1D is at its peak**. A number of companies are currently developing the technology to make possible the cure of the disease and the needle-free revolution. • Although the promises are big, these technologies are still very far from the market. • Our asset will overcome the cell-related issues, to increase the stem potential and feasibility of regenerative therapy in this disease.

*S14: update for IDEA2 faculty