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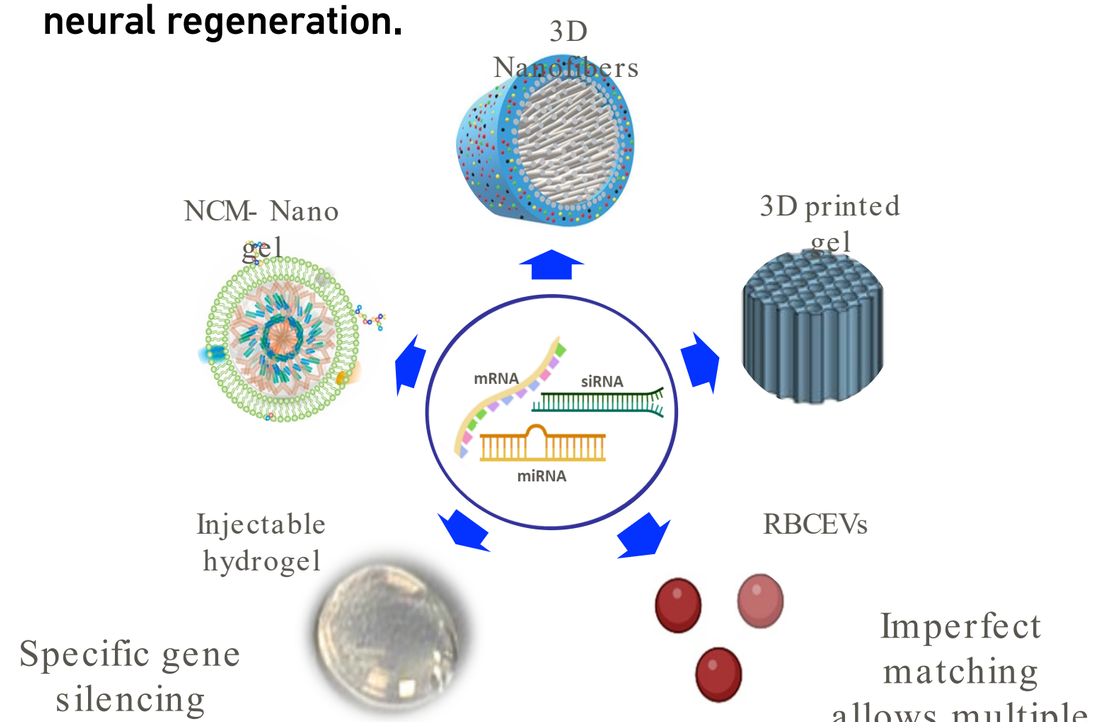
Our lab work focuses on:

- **Designing bio-mimicking scaffolds to induce RNA interference capability.**
- **Scaffold-mediated delivery of small non-coding RNAs - siRNA and microRNAs.**
- **Target cells: CNS cells, stem cells, primary cells**
- **In vitro and in vivo gene silencing aiming to promote neural regeneration.**



Previous work

RNA interference approach	Potential treatments
⇧ host-implant integration (Col1A1 siRNA; miR-124; Let-7c)	Scaffold implantation *(Acta Biomat. 2013, 2018; Adv Health Mat, 2019)*
⇧neuronal differentiation (REST siRNA)	Controlled stem cell differentiation *(Biomaterials 2013, Biomat. Sci. 2018, Macro Bio 2015,)*
⇧oligodendrocyte differentiation & maturation (miR-219 + miR-338)	Remyelination *(Biomaterials 2015, J. Controlled Release 2015, Acta Biomat. 2018, Mol Therapy 2019)*
⇧ Axon local protein synthesis (miR-222, miR-431, miR-132)	Enhance axon intrinsic growth ability *(Adv. Sci 2019, 2021, Biomat Sci 2020)*

Ongoing work

Tools	Advantage
1. Electrospun scaffolds(CRISPR-Cas-9) 2. Neural cell membrane-coated DNA Nano gel 3. Red Blood cell-derived Extracellular Vesicles (myelin miRs) 4. Injectable hydrogel(Axon miRs) 5. 3D Printed scaffolds	1. To deliver protein RNA complex 2. Cell-specific uptake 3. Easy to obtain and non-immunogenic 4. Localized and targeted delivery 5. Customization and patient specific scaffold derivation.