UNIVERSITÀ DEGLI STUDI DI MILANO

D-MEM PhD-UNIMI | Doctorate program Milan EXPERIMENTAL MEDICINE

Project Title: *Correction of the genetic defect in induced pluripotent stem cell lines by chromosome transplantation*

Tutor: *Prof. Massimo Locati*

Co-tutors: *Dott. Paolo Vezzoni* paolo.vezzoni@irgb.cnr.it

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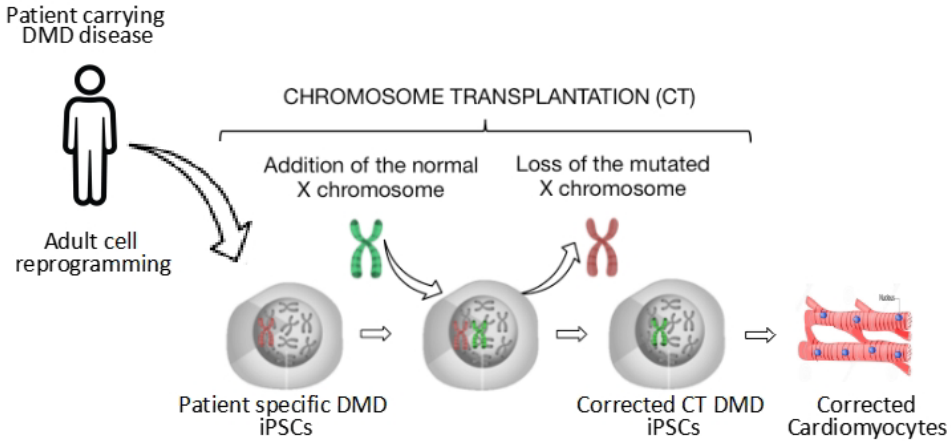
Brief description of the project

Chromosome Transplantation is a novel technology which could in theory allow the correction of the genetic defect of several hereditary diseases. Our project will try to rescue the molecular defect of dystrophin, the gene responsible for Duchenne muscular dystrophy (DMD), by using the chromosome transplantation approach in induced pluripotent stem cells (iPS), followed by differentiation of the corrected cells toward the muscle and cardiac lineage.



Scientific references

1. Paulis M, Susani L, Castelli A, et al. Chromosome Transplantation: A Possible Approach to Treat Human X-linked Disorders. Mol Ther Methods Clin Dev. 2020;17:369-377. doi: 10.1016/j.omtm.2020.01.003.

2. Castelli A, Susani L, Menale C, et al. Chromosome Transplantation: Correction of the Chronic Granulomatous Disease Defect in Mouse Induced Pluripotent Stem Cells. Stem Cells. 2019;37(7):876-887. doi: 10.1002/stem.3006.
3. Paulis M, Castelli A, Susani L, et al. Chromosome transplantation as a novel approach for correcting complex genomic disorders. Oncotarget. 2015;6(34):35218-30. doi: 10.18632/oncotarget.6143.
4. Fortunato F, Rossi R, Falzarano MS, Ferlini A. Innovative Therapeutic Approaches for Duchenne Muscular Dystrophy. J Clin Med. 2021;10(4):820. doi: 10.3390/jcm10040820.

Candidate requirements:

The candidate has to demonstrate experience in the main techniques of cell and molecular biology, mammalian cell culture and immunofluorescence assays. Experience in culturing induced pluripotent stem cells (iPS) and in basic cytogenetic techniques (chromosome preparations, karyotype analysis) and basic molecular cytogenetics (FISH) will be considered as a preferential title.

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Titolo del progetto: Correzione del difetto genetico in linee staminali pluripotenti indotte tramite trapianto di cromosoma

Tutore: *Prof. Massimo Locati*

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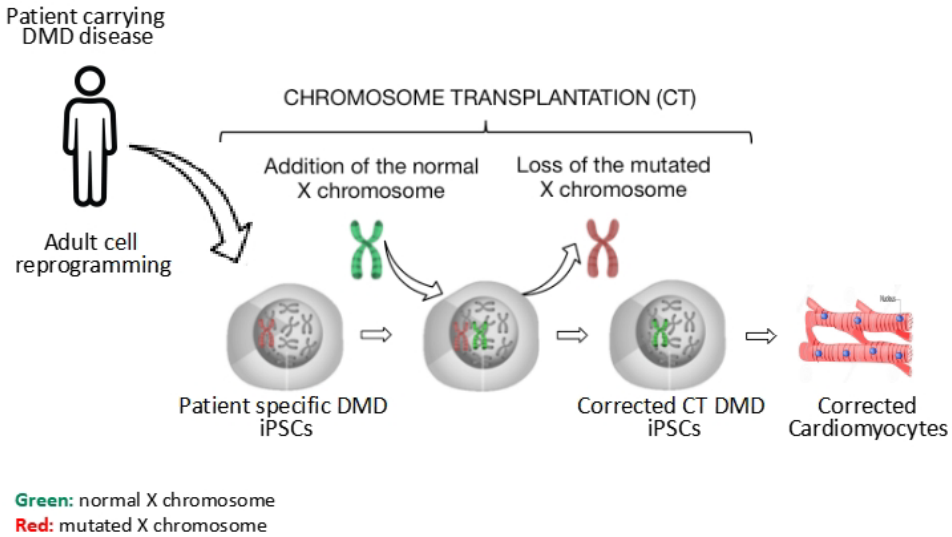
Breve descrizione del progetto

Il Trapianto di Cromosoma è una tecnica innovativa che potrebbe consentire la correzione dei difetti genetici di varie malattie ereditarie. Il progetto prevede l'utilizzo di questa metodica per la correzione del difetto della distrofina, il gene responsabile per la distrofia muscolare di Duchenne (DMD), mediante il trapianto di cromosoma in cellule staminali pluripotenti indotte (iPS) e loro successivo differenziamento verso la linea muscolare e cardiaca.



Referenze scientifiche

1. Paulis M, Susani L, Castelli A, et al. Chromosome Transplantation: A Possible Approach to Treat Human X-linked Disorders. Mol Ther Methods Clin Dev. 2020;17:369-377. doi: 10.1016/j.omtm.2020.01.003.
2. Castelli A, Susani L, Menale C, et al. Chromosome Transplantation: Correction of the Chronic Granulomatous Disease Defect in Mouse Induced Pluripotent Stem Cells. Stem Cells. 2019;37(7):876-887. doi: 10.1002/stem.3006.

3. Paulis M, Castelli A, Susani L, et al. Chromosome transplantation as a novel approach for correcting complex genomic disorders. Oncotarget. 2015;6(34):35218-30. doi: 10.18632/oncotarget.6143.
4. Fortunato F, Rossi R, Falzarano MS, Ferlini A. Innovative Therapeutic Approaches for Duchenne Muscular Dystrophy. J Clin Med. 2021;10(4):820. doi: 10.3390/jcm10040820.

Requisiti del candidato:

Il candidato deve padroneggiare le principali tecniche di biologia cellulare e biologia molecolare, coltura di cellule di mammifero e saggi di immunofluorescenza. Saranno considerate come titolo preferenziale esperienza nel coltivare cellule staminali pluripotenti indotte (iPS) ed in tecniche di citogenetica di base (preparati cromosomici, analisi del cariotipo) e di citogenetica molecolare di base (FISH).