

Press release

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Basic information

Name: Yan Zhou Email: yazh@biomed.au.dk Phone: 91860049

Department of: Biomedicine

Main supervisor: Lars Aagaard

Title of dissertation: Human disease modeling and tissue engineering with iPSCs and CRISPR/Cas9

Date for defence: April 20, 2017 at (time of day): 13:00 Place: Merete Barker Auditorium, The Lake Auditories, Aarhus University.

Press release (Danish)

Human sygdomsmodellering og vævsmanipulation med iPSC og CRISPR/Cas9

Et ph.d.-projekt fra Health, Aarhus Universitet, demonstrerer styrken af at bruge stamceller og editering af genomet til at studere genetiske lidelser. Projektet er blevet udført af Yan Zhou, som vil forsvare sin afhandling den 20. april 2017.

Inducerede pluripotente stamceller (iPSCer) er stamceller dannet fra somatiske celler såsom fibroblaster isoleret fra hudbiopsier. Ligesom ægte stamceller, kan iPSCer differentieres til hvilken som helst celletype. Netop ved at bruge fibroblaster fra patienter der lider af den alvorlige stofskifte lidelse 'MCAD-deficiens', har Yan Zhou med succes omdannet disse til kunstige leverceller. MCAD-deficiens forårsages ofte af en mutation i ACADM-genet og kan medføre alvorlige leverskader. Kunstige leverceller gør det muligt at studere den molekulære patologi hos patienten i laboratoriet. Editering i patientceller ved hjælp af den 'molekulære saks' CRISPR/Cas9 muliggør ligeledes akkurate studier af genernes rolle i MCAD-deficiens. En anden værdifuld anvendelse af iPSCer er som udgangspunkt for såkaldte mesenkymale stamceller. Mesenkymale stamceller kan efterfølgende udnyttes til bl.a. vævsregenerering af knogle og brusk, og bliver almindeligvis isoleret direkte fra patientens knoglemarv. For at undgå denne invasive procedure, har Yan Zhou udviklet en effektiv metode til at omdanne iPSCer til mesenkymale stamceller.

Forsvaret er offentligt og finder sted den 20. april kl. 13 i Merete Barker Auditoriet, Søruditorierne, Aarhus Universitet. Projektets titel er "Human sygdomsmodellering og vævsmanipulation ved hjælp af iPSCer og CRISPR/Cas9". For yderligere information kontakt venligst ph.d.-studerende Yan Zhou på e-mail: yazh@biomed.au.dk eller telefon +45 9186 0049.

Press release (English)

Human disease modeling and tissue engineering with iPSCs and CRISPR/Cas9

A PhD project from Health, Aarhus University, demonstrates the powerful use of stem cells and genome editing technologies for studying genetic disorders. The project was carried out by Yan Zhou, who will be defending his dissertation on April 20, 2017.

Induced pluripotent stem cells (iPSCs) are stem cells generated from adult somatic cells such as fibroblasts isolated from skin biopsies. Like true stem cells, iPSCs can differentiate into any cell type. Using fibroblasts from patients suffering from a severe metabolic disorder called 'MCAD deficiency', Yan Zhou successfully turned these into artificial liver cells. MCAD deficiency is often caused by a single mutation in the ACADM gene, and may lead to severe liver damage. Artificial liver cells make it possible to study the molecular pathology outside the patient. Genome editing of patient cells using the 'molecular scissor' CRISPR/Cas9 allows even more accurate studies of MCAD deficiency. Another

valuable application of iPSCs is to generate mesenchymal stem cells which in turn can be used for tissue engineering, such as generation of bone and cartilage. Mesenchymal stem cells are usually isolated directly from the bone marrow of patients. To avoid this invasive procedure, Yan Zhou has developed a simple method for deriving mesenchymal stem cells from iPSCs.

The defense is public and takes place on the 20th of April at 1pm in the Merete Barker Auditorium, The Lakeside Theatres, Aarhus University. The title of the project is "Human disease modeling and tissue engineering with iPSCs and CRISPR/Cas9". For more information, please contact PhD student Yan Zhou, email: yazh@biomed.au.dk, Phone +45 9186 0049.

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