Analysis of the RNA-binding Protein FUS and Its Role in Neurodegenerative Disease

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Country

USA

Title of project or programme

Analysis of the RNA-binding Protein FUS and Its Role in Neurodegenerative Disease

Source of funding information

NIH (NINDS)

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15/02/2015

Total duration of award in years

2

The project/programme is most relevant to:

Motor neurone diseases

Keywords

sarcoma, RNA-Binding Proteins, Amyotrophic Lateral Sclerosis, Neurodegenerative Disorders, RNA Binding

Research Abstract
Project Summary/Abstract: Fused in Sarcoma (FUS) is a human RNA-binding protein,

mutations in which can cause amyotrophic lateral sclerosis (ALS). ALS is a devastating neurodegenerative disease affecting 1 in 50000 people in the U.S. each year and has 50% mortality within 3 years of diagnosis. Mutations in FUS are the second leading genetic cause of ALS, responsible for 5% of familial and 1% of sporadic ALS. I have discovered that the primary function for FUS in cells is to regulate phosphorylation of RNA polymerase II, the polymerase in cells that produces mRNA. This model rationalizes previous reports that loss or overexpression of FUS in cells leads to altered transcription and mRNA processing. This project will focus on further establishing the mechanism of FUS activity on transcription in cells and determining the role that FUS plays in ALS pathology. After completion of key studies and development of the assays necessary to complete these investigations during the mentored phase, this project will then turn during the independent R00 phase to test hypotheses concerning how noncoding RNAs and specific domains of the FUS contribute to FUS activity in cells. I will also investigate the extent to which loss of FUS activity contributes to ALS pathology in a cell-based model. Because the molecular mechanisms of ALS pathology remain unknown, understanding the cellular role of FUS will provide mechanistic insight into ALS pathology and facilitate further medical research into the causes and therapeutic strategies for the treatment of ALS.

Lay Summary
FUS is a protein with a poorly defined cellular function and that mutant forms were recently found to cause the neurodegenerative disease, amyotrophic lateral sclerosis (ALS). ALS is a devastating disease affecting 1 in 50000 in the U.S. per year with a 50% mortality by year 3 following diagnosis. This study will seek to provide a mechanistic model for the role that FUS plays in normal cellular biology and in ALS pathology.

Further information available at:

Types:
Investments > €500k

Member States:
United States of America

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Motor neurone diseases

Years:
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