

ABSTRACT SUBMISSION FORM

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SEX + GENDER

Exploring the role of sex and gender on health research



CHR D 2020: Abstract Submission Form

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Title

Casein Kinase 2 Catalytic Subunits $\alpha 1/\alpha 2$ of the SSU Processome's Utp-C Subcomplex Regulate Ribosome Biosynthesis

Background

Cell growth is directly dependent on the rate of ribosome assembly. Defects in ribosome assembly result in diseases known as ribosomopathies which includes many cancers. The nucleolus (the site of ribosome assembly) contains the Small Subunit Processome (SSUP), an 80S ribonucleoprotein which directs the assembly of the small subunit of the ribosome. The CK2 protein complex, a candidate member of the SSUPs UTP-C sub-complex, consists of two catalytic and regulatory subunits, is known to regulate all three RNA polymerases and acts as a possible "master regulator" of cell growth through ribosome biosynthesis. The CK2 protein complex is constitutively active and has over 300 substrates.

Objective

Establish the CK2 proteins as bona fide members of the SSUP and demonstrate their regulatory role in ribosome biosynthesis and cellular growth.

Methods

We have created yeast strains in which we can genetically deplete CK2 proteins. We are identifying the contribution of the CK2 proteins by genetically depleting components individually and in pairs and using growth curves as a proxy for ribosome assembly. Northern analysis will be used to monitor pre-rRNA processing. Co-IPs of CK2 proteins with known SSUP components will confirm CK2 as a member of the SSUP.

Results

Cellular growth is reduced in single depletion of the CK2 catalytic subunits and is synthetically lethal in depletion of both catalytic subunits as seen in growth curves. CK2 was shown to co-IP both the Kre33 protein and the U3 snoRNA of the SSUP making it a bona fide member of the SSUP. Northern analysis may show decreased mature 18S RNA and an increase in pre-18S accumulation showing a dysfunctional

SSUP.

Conclusion

We have validated the membership of the CK2 complex in the SSUP and shown that depletion of the two catalytic CK2 proteins has a major impact on cell growth, likely through a dysregulation of ribosome assembly.

Theme:

Basic Science

Do you have a table/figure to upload?

No

Are you willing to participate in Goodbear's Den?

Yes

Presenter Status:

Masters Student

What was your role in the project?

All of the above

Authors

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