IJAE
Vol. 119, n. 1 (Supplement): 95, 2014
ITALIAN JOURNAL OF ANATOMY AND EMBRYOLOGY

The role of CDK9 in myogenesis

Giacinti C.[1], Chiandotto S.[2], Tomei V.[3], Candolfi N.[2,3], Casini N.[3], Molinaro M.[2], Vivarelli E.[2], Musarò A.[2], Giordano A.[4]

[1] Institute of Histology and Embryology, Catholic University School of Medicine, 00168 Rome, Italy
[2] SAIMLAL, University of Rome "Sapienza",p.le Aldo Moro, Roma
[3] Human Pathology and Oncology Department; University of Siena; Siena, Italy
[4] Sbarro Institute for Cancer Research and Molecular Medicine,Temple University, Philadelphia

Cdk9 is a member of cyclin-dependent kinases (cdks). It is expressed in human and murine tissues with high levels in terminally differentiated cells. It is involved in the regulation of transcriptional elongation via phosphorylation of CTD of RNA polII (1).

It has been demonstrated that CdK9, complexed with CyT2a, plays a role in the activation of myogenic program. Moreover Cdk9-CyT2a activity is not down-regulated in myotube formation, but its activation contributes to the transcriptional activity MyoD-mediated during myogenic program (2).

Recently, a 55 kDa protein called cdk9-55 has been identified. Cdk9-55 is significantly upregulated in cells induced to differentiate, either in C2C12 cells or in satellite isolated cells. In addition, it has been demonstrated that there is a clear induction of cdk9-55 expression in injured skeletal muscles (3).

In order to deepen the discussion and extend the understanding of the biological role of the two isoforms of cdk9 during skeletal muscle differentiation process, we report the role of the two isoforms during in vivo mouse myogenesis. We have analyzed the behavior of CDk9-42 and CDK9-55 in primary and secondary myogenesis. Of particular interest are the apparent inverse correlation between the two cdk9 isoforms during the events of limbs formation and how the expression of two CDK9 isoforms, in combination with specific positive (Cycline T1,T2,k) or negative regulators (7SKsnRNA/Hexim1), is associated to a specific cellular phenotype and correlated to a specific function.

References

[1] Liu et al. (2000) Genomic organization and characterization of promoter function of the human CDK9 gene. Gene 252.1-2 : 51-59.
[2] Giacinti et al. (2006) MyoD recruits the cdk9/cyclinT2 complex on myogenic-genes regulatory regions. Journal of cellular physiology 206: 807-813.
[3] Giacinti et al. (2008) CDK9-55: a new player in muscle regeneration. Journal of cellular Physiology 216:576-582.

Keywords
Skeletal muscle differentiation, myogenesis, cdks.