Correlation between COX-2 and Ch 7q copy number alterations in Ch 11q-deleted pediatric neuroblastoma tumors

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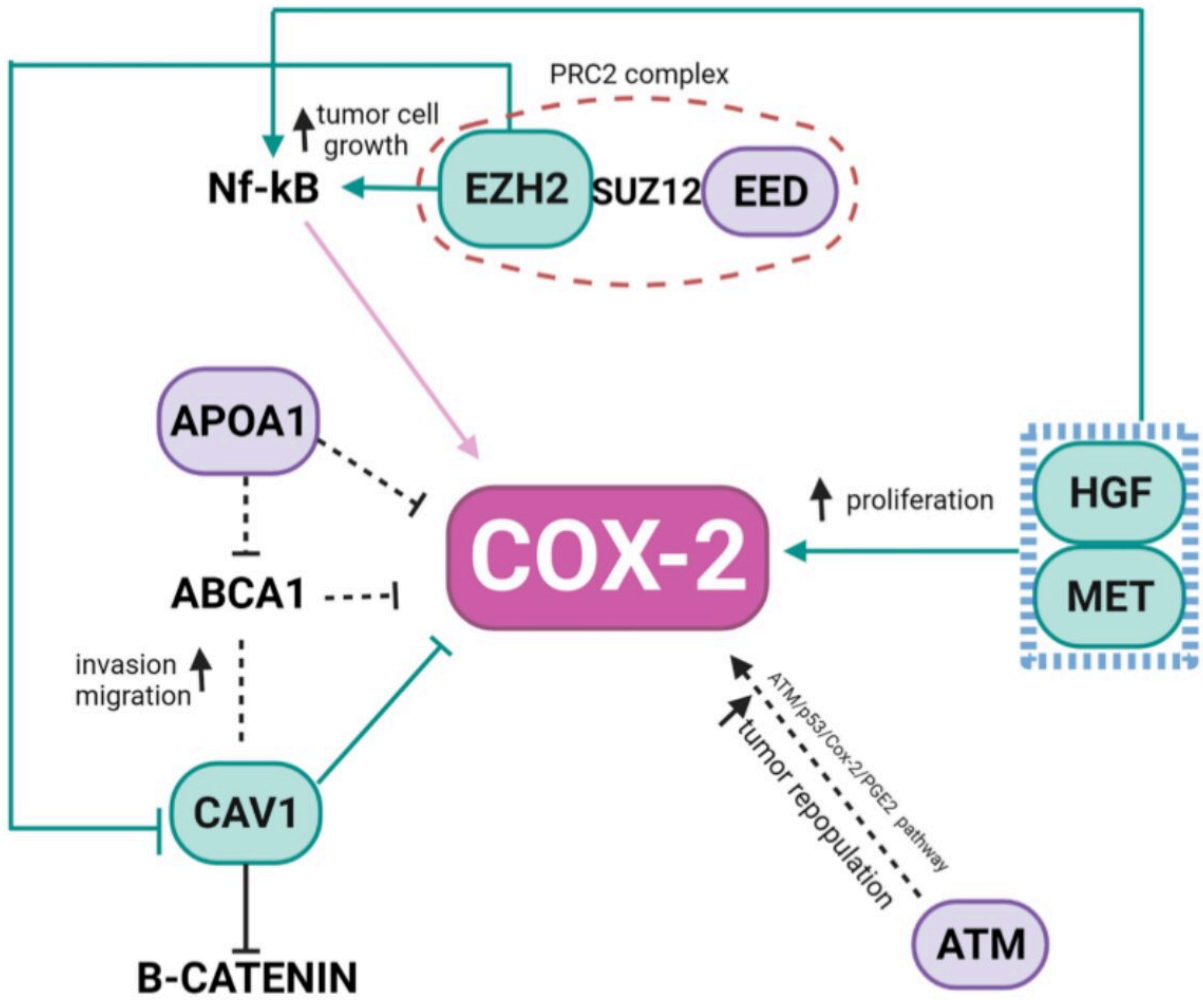

Representation of the interconnection of genes of higher relevance in the network as described previously. Credit: *Genes & Cancer* (2022). DOI:

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A new research paper was published in *Genes & Cancer* on December 2, 2022, entitled, "Systems biology network reveals the correlation between COX-2 expression and Ch 7q copy number alterations in Ch 11q-deleted pediatric neuroblastoma tumors."

Tumor-associated inflammation and chromosomal aberrations can play crucial roles in cancer development and progression. In neuroblastoma (NB), the enzyme cyclooxygenase-2 (COX-2) is associated with copy number alterations on the long arm of chromosome 11 (Ch 11q), defining an aggressive disease subset.

In this new retrospective study, researchers from Thatyanne Gradowski Farias da Costa do Nascimento, Mateus Eduardo de Oliveira Thomazini, Nilton de França Junior, Lisiane de Castro Poncio, Aline Simoneti Fonseca, Bonald Cavalcante de Figueiredo, Saulo Henrique Weber, Roberto Hirochi Herai, Lucia de Noronha, Luciane R. Cavalli, Bruno César Feltes, and Selene Elifio-Esposito from Pontifícia Universidade Católica do Paraná, Faculdades Pequeno Príncipe, Instituto Buko Kaesemodel (IBK), Georgetown University, and Federal University of Rio Grande do Sul included formalin-fixed paraffin-embedded tumor samples collected from nine patients during diagnosis at the pediatric Pequeno Principe Hospital, Curitiba, PR, Brazil, and post-chemotherapy (CT).

"In the current study, we analyzed the COX-2 levels in NB tumor samples and correlated this expression with segmental chromosome aberrations. Using a pipeline of computational systems biology tools, we investigated the direct and indirect connections between PTGS2 and correlated aberrations to search for new insights on inflammation in the

pathophysiology of high-risk NB," state the researchers.

COX-2 expression was evaluated using immunohistochemistry and correlated with the genome profile of paired pre- and post-CT samples, determined by array comparative genomic hybridization. A systems biology approach elucidated the PTGS2 network interaction.

The results showed positive correlations between pre-CT Ch 7q gain and COX-2 expression ($\rho = 0.825$; p-value = 0.006) and negative correlations between Ch 7q gain and Ch 11q deletion ($\rho = -0.919$; p-value = 0.0005). Three samples showed Ch 11q deletion and Ch 7q gain. Network analysis identified a direct connection between CAV-1 (Ch 7q) and COX-2 in NB tumors and highlighted the connection between amplified genes in Ch 7q and deleted ones in 11q.

"The identification of hub-bottleneck-switch genes provides new biological insights into this connection between NB, tumorigenesis, and inflammation," the researchers conclude.

More information: Thatyanne Gradowski Farias da Costa do Nascimento et al, Systems biology network reveals the correlation between COX-2 expression and Ch 7q copy number alterations in Ch 11q-deleted pediatric neuroblastoma tumors, *Genes & Cancer* (2022). DOI: 10.18632/genesandcancer.225

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