Regulation of the activity of the promoter of RNA-induced Silencing, C3PO

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RNA-induced silencing is a process which allows cells to regulate the synthesis of specific proteins. RNA silencing is promoted by the protein C3PO (component 3 of RISC). We have previously found that phospholipase Cβ, which increases intracellular calcium levels in response to specific G protein signals, inhibits C3PO activity towards certain genes. Understanding the parameters that control C3PO activity and which genes are impacted by G protein activation would help predict, which genes are more vulnerable to down-regulation? Here, using a library of 1018 oligonucleotides, we show that C3PO binds oligonucleotides with structural specificity but little sequence specificity. Alternately, the rate of hydrolysis is exquisitely sensitive to the substrate stability. Importantly, we find that oligonucleotides with higher Tm values are inhibited by bound PLCβ. This finding is supported by microarray analysis in cells over-expressing PLCβ1. Taken together our work enables predictions of the genes whose post-transcriptional regulation is responsive to the G protein/phospholipase Cβ/calcium signaling pathway.

Speaker Biography

Suzanne Scarlata is a Professor Emeritus of Stony Brook University and a Whitcomb Chair at Worcester Polytechnic Institute. Most of her research has focused on the regulation of G protein signaling in model systems and in cultured cells using primarily fluorescence methods. The work presented here represents an unexpected connection between the impact of extrasensory information and post-transcriptional gene regulation through the Gαq/phospholipase Cβ signaling pathway.

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