

POSTER PRESENTATION

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Origin and extension of the IFT complex in early eukaryotic evolution

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Background

The intraflagellar transport (IFT) complex is an ancient protein complex that facilitates active trafficking of proteins and molecules across the eukaryotic cilium. Based on similar domain compositions Avidor-Reiss *et al.* (2004) and Jékely *et al.* (2006) postulated that the IFT originates from an ancestral proto-coatomer complex that also gave rise to vesicle coating complexes (e.g. COPI, COPII, Clathrin) and the Nuclear Pore Complex. Using comparative genomics we provide direct phylogenetic evidence of the proto-coatomer origin of the IFT.

Results

We identified the COPI α , - β 2 and - ϵ subunits as closest paralogs to 12 IFT subunits comprising all three sub-complexes (IFT-A, -B and the BBSome). Our analysis suggests that IFT-A and the BBSome arose from an IFT-B like proto-IFT complex by intra-complex duplication of subunits. We show that the BBSome is a modular component that is lost in eukaryotic species as a precursor to ciliary loss in organisms such as fungi, apicomplexa and plants.

Conclusions

Identification of the proto-coatomer origin and subsequent evolution of the IFT complex strengthens the suspected involvement of IFT components in vesicle transport and provides a rationale for its mechanism. Expansion of ancestral subunits by duplication as well as co-evolution of specific subunits provides some insight on modularity and internal structure of the IFT complex.

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