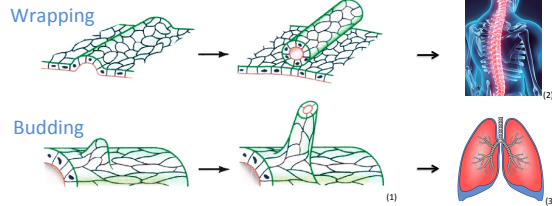


The *Imaginal disc growth factor 3* interacts with *comover*, a Planar Cell Polarity component, during dorsal appendage formation

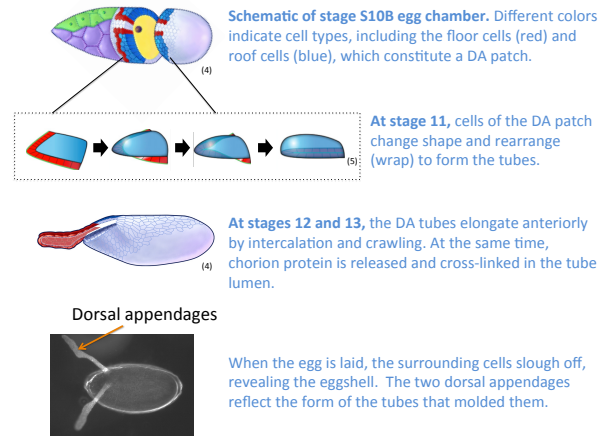
Claudia Espinoza and Celeste Berg
Department of Genome Sciences, University of Washington

Background

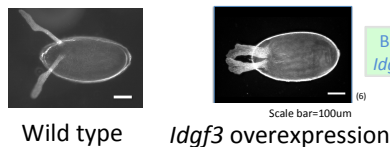
Mechanisms of biological tube formation define the structure and function of organs.



Drosophila use the wrapping mechanism to create two eggshell dorsal appendages (DAs)



The *Imaginal Disc Growth Factor 3* (*Idgf3*) plays a role in DA formation and its overexpression causes DA defects.



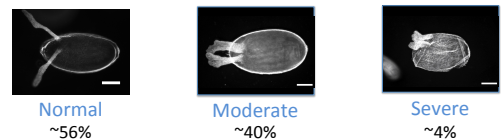
Our knowledge of *Idgf3* is limited, and its genetic pathway is a mystery.

Question

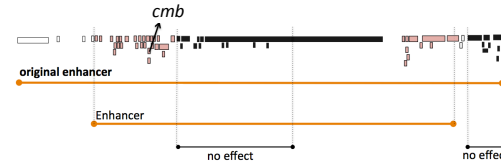
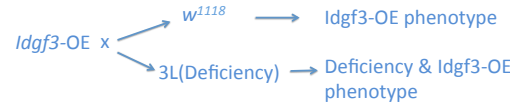
What genetic pathway does *Idgf3* interact with for dorsal appendage formation?

Methods and Results:

Overexpression of *Idgf3* causes DA defects with incomplete penetrance.



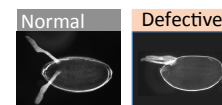
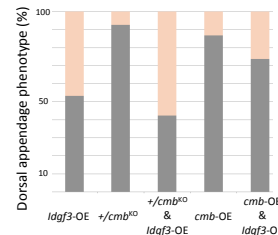
Modifier screen identifies a region on 3L that enhances the *Idgf3* overexpression (*Idgf3*-OE) phenotype.



Schematic of Gene Browser map showing:

- Potential interacting genes
- Non-interacting genes
- Genes of unknown interaction
- Deficiencies that uncover the region

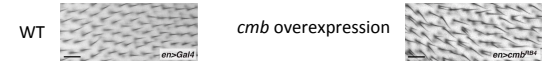
cmb^{KO} enhances and *cmb*-overexpression suppresses the *Idgf3* overexpression phenotype.



representative data of 3 replicas
n > 100

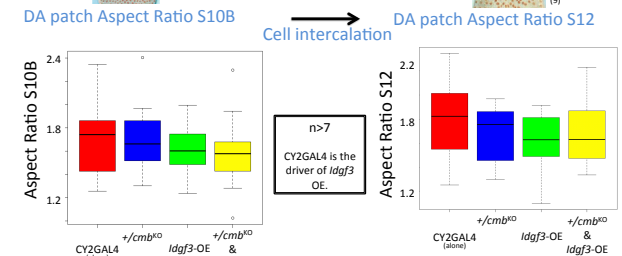
What is it known about *cmb*?

- *cmb*, a substrate of Rho Kinase, physically interacts with *multiple wing hair* (*mwh*) and is involved in wing hair formation.

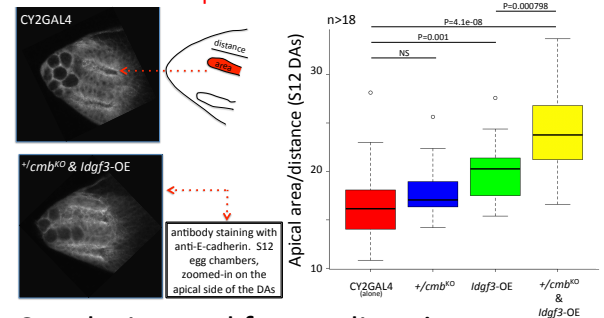


- Wing hair formation is regulated by the Planar Cell Polarity (PCP) pathway.
- The Planar Cell Polarity pathway drives cell intercalation of epithelial sheets.

Do *Idgf3* and *cmb* affect cell intercalation during tube formation? They do not!



Overexpression of *Idgf3* alone and with *cmb*^{KO} affect apical area of DA tubes



Conclusion and future directions

- *Idgf3* genetically interacts with *cmb* for DA formation.
- *Idgf3* OE affects apical DA tube area, and this effect is enhanced by *+cmb*^{KO}.
- Is this effect a result of *Rok*'s known function on setting up apical tension?
- Measuring Myosin-II of the apical side of DA tubes will help us understand if *Idgf3*-*cmb* is affecting the apical tension of the tubes.

Acknowledgements: Thanks to: all the Berg lab for their support on this project, to professor Andreas Jenny for providing the *cmb* alleles, to the Bloomington Stock center for providing the deficiency stocks, to the Developmental Studies Hybridoma Bank for antibodies to E-cadherin. Grants: NIH 2-R01-GM079433, NSF Graduate Research Fellowship.

References: (1) Lubarsky and Krasnow. 2003. (2) Google photos: www.thornburylaw.com/sites/www.thornburylaw.com (3) Google photos: besthealthyside.com/wp-content/uploads/2018/10/lungs-1038x576.jpg (4) Dorman, James, Fraser, Kiehart and Berg. 2004. (5) Osterfield, Du, Schupbach, Wieschaus and Shvartman. 2013 (6) Zimmermann, Merrill, MacCoss and Berg, C.A. 2017. (7) Fagan, Dollar, Lu, Barnett, Jongs, Schlosser, Pfeiffer, Adler and Jenny. 2014. (8) Keller and Goto. 2002. (9) Ward and Berg. 2005.