The importance of trehalose metabolism for proper Drosophila

immune response during parasitoid infection Michalina Kazek*, Tomáš Doležal

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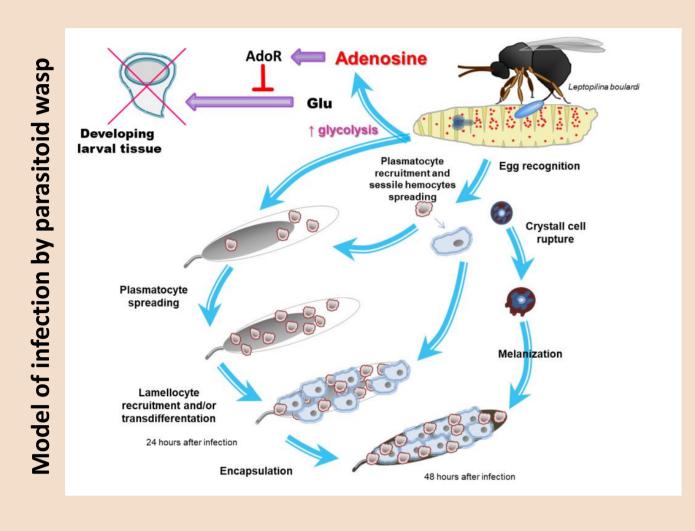
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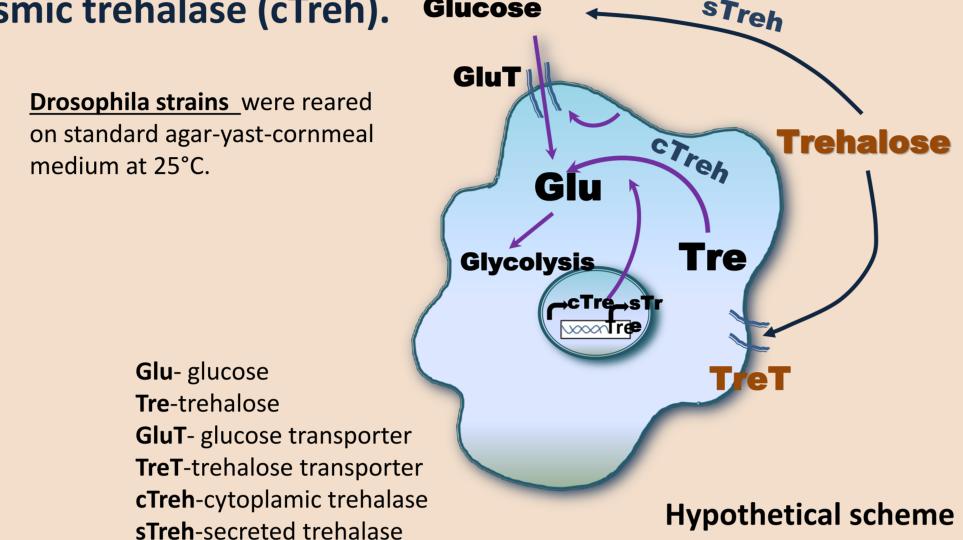


BACKGROUND

trehalose, which principal sugar insects present higher concentration Trehalose hemolymph than glucose. much is a non-reducing sugar, which can be rapidly cleaved to two glucose molecules by trehalase enzyme. However, the physiological role of trehalose during the immune response after parasitoid infection remains largely unclear. It is known that two versions of trehalase, cytoplasmic and secreted, exist in Drosophila. The secreted version is used to keep circulating glucose, by hydrolyzing trehalose, at a stable level and this seems to be a part of the systemic regulation of carbohydrate metabolism.

Activated insect immune cells uptake trehalose and convert it into glucose inside the cell by cytoplasmic trehalase (cTreh). Glucose

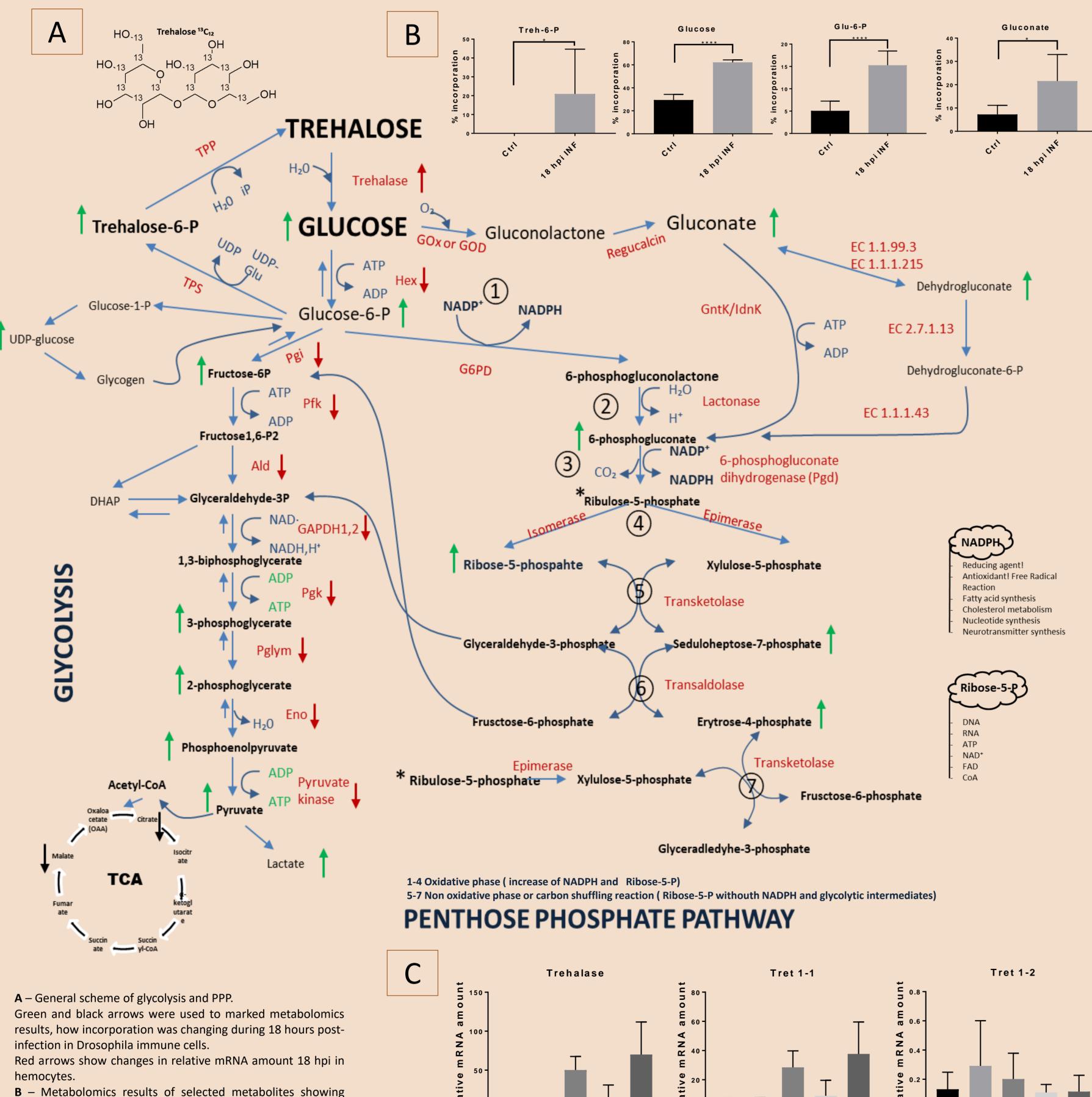




sTreh-secreted trehalase

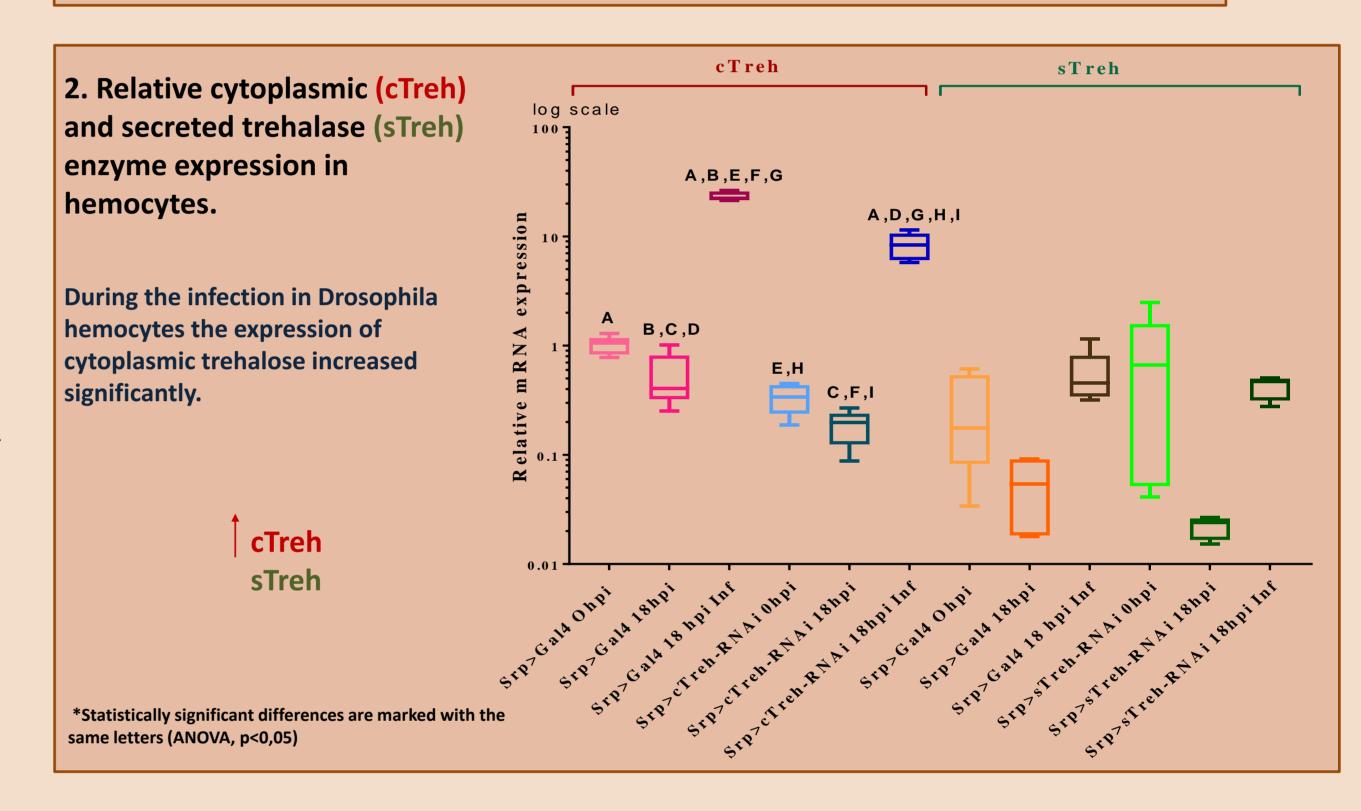
RESULTS

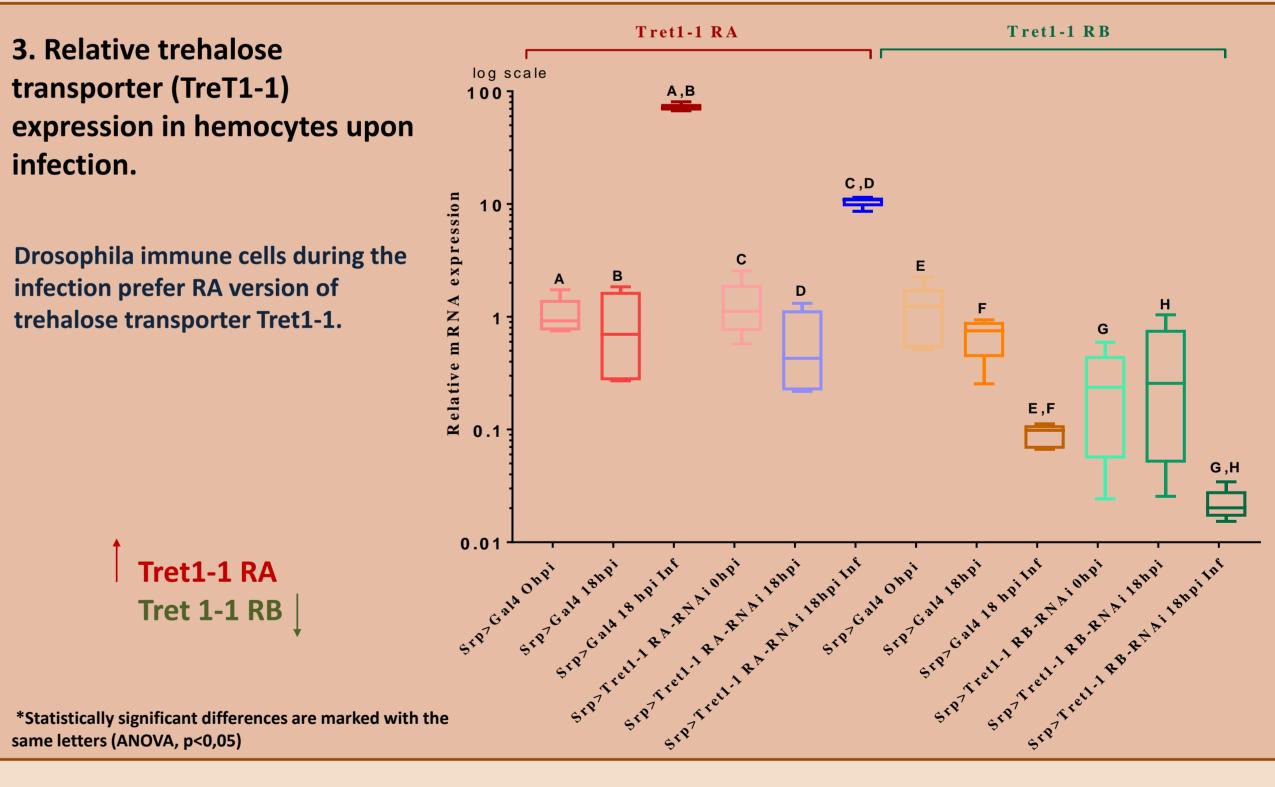
5. Percent of incorporation of labeled ¹³C₁₂ trehalose and relative enzymes expression (RNAseq) in hemocytes upon infection.

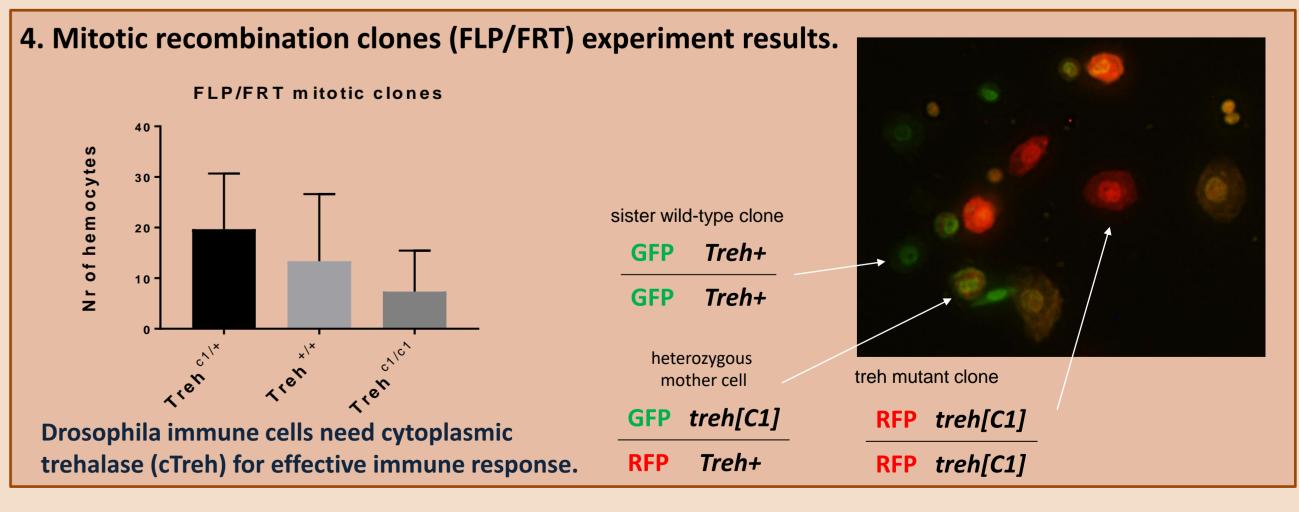


RESULTS 1. Number of lamellocytes upon TreT1-1 and Treh knockdown. **Tret 1-1 RNAi** Treh **RNAi** Number of lamellocytes significantly decreases upon infection in both TreT1-1 and Treh RNAi fly lines. *Srp – serpentine; encodes a putative chitin deacetylase. It is expressed by the epidermal and tracheal cells and is secreted into the

**Hml – hemolectin; encodes a large multidomain protein produced by hemocytes (plasmatocytes) and involved in the clotting







CONCLUSION

C – RNAseq results showing a relative mRNA amount for some

selected compounds connected with the trehalose pathway.

changes in the incorporation of labeled trehalose.

Drosophila immune cells use trehalose transporter (Tret1-1 RA version) and cytoplasmic trehalase during parasitoid wasp infection, and they both are required for effective immune response. Knocking down trehalose transporter and trehalase enzyme, specifically in hemocytes, significantly decreases resistance to parasitoid. Immune response is energy demending process and need a lot of glucose/trehalose. Increasing of glycolysis and penthose phosphate pathway are essential for proper immune reaction.

Our results are in agreement with a concept of "selfish immune system", where immune cells must be privileged and have unlimited access to nutrients during infection (more details on POSTER #1843A)

ACKNOWLEDGEMENT





apical extracellular space (FlyBase).

reaction (FlyBase).



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