

# **RhoD is a Golgi component with a role in anterograde protein transport from the ER to the plasma membrane**

Magdalena Blom<sup>1</sup>, Katarina Reis<sup>1</sup>, Vishal Nehru<sup>1</sup>, Hans Blom<sup>2</sup>, Annica K. B. Gad<sup>1</sup> and Pontus Aspenström<sup>1\*</sup>

<sup>1</sup>Department of Microbiology, Tumor and Cell Biology, Karolinska Institutet, Stockholm, Sweden

<sup>2</sup>Applied Physics, Royal Institute of Technology, Science for Life Laboratory, Stockholm, Sweden

Email: pontus.aspenstrom@ki.se

**Keywords:** *Rho GTPases; RhoD; WHAMM; Golgi; VSV-G*

## **Abstract**

RhoD is a member of the Rho GTPase family and coordinates actin dynamics and membrane trafficking. Activation of RhoD results in formation of filopodia, dissolution of stress fibers, and the subsequent formation of short actin bundles. In addition, RhoD localizes to early endosomes and recycling endosomes, and has a regulatory role in endosome trafficking. In this study, we report on a novel function of RhoD in the regulation of Golgi homeostasis. We show that manipulation of protein and activation levels of RhoD, as well as its binding partner WHAMM, result in derailed localization of Golgi stacks. Moreover, vesicle trafficking from the endoplasmic reticulum to the plasma membrane via the Golgi apparatus, as measured by the VSV-G protein, is severely hampered by manipulation of RhoD or WHAMM. Compared to the control cells, only a small fraction of the WHAMM or RhoD mutant expressing cells were able to transport the VSV-G protein to the plasma membrane. Silencing of RhoD or WHAMM did not affect the transport between ER and Golgi, although the Golgi apparatus was dispersed. However, the subsequent transport from Golgi to the plasma membrane was significantly delayed, in particular in cells with both reduced RhoD and WHAMM expression, revealing the importance of RhoD and WHAMM in this process.

In summary, our studies demonstrate a novel role for a member of the Rho GTPases in the regulation of Golgi function.