

# [The at the site of cytokinesis (seguí-simarro](https://assignbuster.com/the-at-the-site-of-cytokinesis-segu-simarro/)

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The mutation of this complex impairstethering and fusion of the vesicles that results in accumulation of vesiclesinside cell. (Novick et al. 1980; Heider and Munson, 2012). During cell division, cell plateformation is carried out by the accumulation of the vesicles at the site ofcytokinesis (Seguí-Simarro et al. 2004) and their fusion by theexocyst complex (Žárský et al.

2013). Mutation of exo 70A1 shows some defectsin cell plate formation (Fendrych et al. 2010), inability in root growth, lossof apical dominance, impaired flower development and smaller organs whichproves that they are important in growth and development process (Synek et al. 2006).

There aredifferent isoforms of the exocyst subunits, which regulate exocytosis relatedto biotic (Pe? enková et al. 2011) and abiotic stress (Lin et al. 2013; Žárskýet al. 2013) and other functions such as membrane recycling, autophagy relatedvesicular transport (Žárský et al. 2013).

Sec3 are the primary subunit toconnect with the target membrane (Finger et al. 1998), their mutants in yeastresulted accumulation of the secretory vesicle in cytoplasm as they were unableto dock with the membrane (Finger and Novick, 1997). Sec 3 mutants are reportedwith root hair growth defects that leads to various growth defects in plants(Wen et al. 2005).

Mutation of Sec 8shows defective pollen germination and tube growth (Cole et al. 2005). Thesubunit exo84 plays key role in formation of exocyst complex and targeting(Zhang et al. 2005). Study of Exo 84 mutation in yeast indicate their role inpost Golgi secretion process (Zhang et al. 2005).

Exo 84 homolog exo84bmutation resulted vesicles accumulation in cytoplasm, cytokinesis defects, irregularphenotype with retarded growth and sterility (Fendrych et al. 2010).  The accumulated vesicles in exo84 mutantscontain compounds such as pectin and xyloglucan (Fendrych et al. 2010). Othersubunits such as SEC6, SEC8, SEC15b and EXO70A1 are also detected in variousstages of cell plate formation (Fendrych et al. 2010).

In plants mutation ofSec5, Sec6, Sec8, Sec15a resulted less pollen germination with reduced growth(Hala et al. 2008). During cytokinesis secretory vesicles are directed to thecell plate formation matrix where exocyst complex assist tethering and fusion (Fredrychet al. 2010).

After fusion vesicles are elongated projecting dumbbell shape, connect other vesicles and form a perforated layer with network of tubes and vesicleswith callose deposition (Fendrych et al. 2010). Till date study of exocyst complextowards defense is limited however, from the perspective of cellular responsetowards various biological activity as they relate repair and growth, speculation could be made from these experiments that they use these similarstrategies in defense responses (Pe? enková, et al. 2011, 2017).

All the exocystsubunits have their homologs in plants (Elias et al. 2003; Synek et al. 2006). Mutationof exocyst subunits; Sec5, Sec6, Sec8, Sec15A, Exo70B, and Exo 84B in Nicotiana benthamiana plants resultedimpaired resistance to Phytophthora infestans(Du et al. 2017).

Also, Sec5, Sec6, and Sec10 mutants in N. benthamiana showed more bacterial infection and growth whereasmutants of other subunits had no effect on resistance (Du et al. 2017). Theexocyst subunit Sec5 is related with the secretion of Pathogenesis-Related (PR)proteins as their mutants produced less PR proteins with higher susceptibilityto fungal pathogen (Du et al. 2015).

Plants pathogens with their virulence geneattack components of vesicle transport system by impairing secretion ofGolgi-derived vesicles (Driouich et al. 1997), callose deposition andpenetration resistance (Nielsen et al. 2012). Thus, although limited experimentshave been conducted regarding their defense responses however as describedabove, earlier experiments related to either growth, development and repair ordefense process and mechanism, indicate that the octameric protein complexexocyst is involved in the defense processes providing genetic resistance inplants thereby playing a vital role in the vesicle membrane fusion.