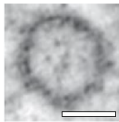
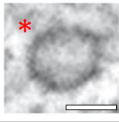
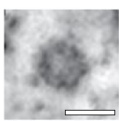
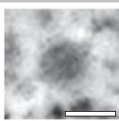
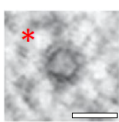

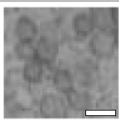
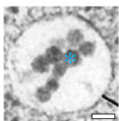
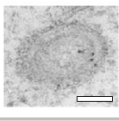


**Table 2** Vesicle morphology in plant cells described from EM approaches. The SV, COPII, COPIa, COPIb and CCV images are from electron tomogram slices (taken from Donohoe et al. 2007). The SV and CCV images are representative of EM images in the higher plant literature and identification was made by morphological characteristics. COPII and COPI vesicles were identified by morphology, location near the Golgi and with antibody labelling for COPII (anti-AtSAR1) and COPI (anti-At- $\gamma$ -COP). The COPIa and COPIb distinction is attributed to slight differences in the coat of the vesicles and on the location of the vesicle as discussed in Donohoe et al. (2007). The CESA-vesicle image is a freeze fracture replica (Giddings et al. 1980) showing the CSC rosettes

(arrows) within the vesicle and is probably similar to the SmaCCs/MASCs described recently from fluorescence images. Currently there are no clear EM images published of SmaCCs/MASCs. The SVC (Toyooka et al. 2009) in the centre of the image, made up of seven vesicles, could be equivalent to the free-TGN described by Kang (2011). MVBs are distinctive organelles that contain small vesicles within the MVB lumen (Segui-Simarro and Staehelin 2006). MVBs have been described in many plant cells after either endocytosis or in relation to pathogen response (An et al. 2006). The EXPO organelle was described by Wang et al. (2010) and is part of the UPS pathway. The EXPO organelle fuses with the PM and releases an exosome

| Vesicle                           | Example image   | Pathway  | Size                                   | Membrane and coat                                   | Contents                                       | Ref  |
|-----------------------------------|---|--|--|---|--|--|
| SV (secretory vesicle)            |    | Secretion from TGN to PM                             | ~80 nm range of 52-107 nm              | Staining varies, most are lightly stained           | Most are lightly stained, variable.            | Donohoe et al. 2007                        |
| COPII                             |    | Transport from the ER to Golgi (ERES)                | ~60 nm                                 | Indistinct, globular dark layer, outer coat (*)     | Lightly stained                                | Donohoe et al. 2007                        |
| COPIa (Coat protein 1a)           |    | Recycling from cis-Golgi to ER                       | ~45 nm                                 | Limiting membrane, irregular, not well defined      | More lightly stained than COPIb                | Donohoe et al. 2007                        |
| COPIb                             |   | Recycling between TGN & cisternae                    | ~45 nm                                 | Two layer coat, dark outer layer, distinct geometry | More darkly stained                            | Donohoe et al. 2007                        |
| CCV (clathrin coated vesicles)    |  | Endocytosis & PM protein recycling                   | ~35 nm                                 | Hedgehog-like outer coat (*), membrane for vesicle. | Electron lucent                                | Donohoe et al. 2007; Robinson & Pimpl 2014 |
| CESA-vesicle (MASC/ SmaCC?)       |  | CESA secretion, constitutive cycling and endocytosis | ~200 nm <sup>a</sup>                   | unknown   | unknown  | Giddings et al. 1980                       |
| SVC (SV cluster)                  |  | Secretion from TGN to PM                             | Clusters of 5-12 vesicles of 50-100 nm | Outer membrane                                      | Lightly stained                                | Toyooka et al. 2009                        |
| MVB (multi-vesicular body)        |  | Endocytosis/ UPS                                     | ~360 nm <sup>a</sup>                   | Outer membrane                                      | Lightly stained with intraluminal vesicles (*) | Segui-Simarro et al. 2006                  |
| EXPO (exocyst-positive organelle) |  | UPS  | ~260 nm <sup>a</sup>                   | Double membrane                                     | Lightly stained                                | Wang et al. 2010                           |

Bars = 50 nm for SV, COPII, COPIa,b, and CCV; bars = 100 nm for CESA-vesicle, SVC, MVB and EXPO

<sup>a</sup> Sizes measured from references cited using ImageJ, approximation only

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