



**Supplementary Figure 1** Distribution and spectral characteristics of Chl *b*- and Chl *d*- containing cyanobacteria in didemnid ascidians. **a.** Vertical cross section through a *Lissoclinum patella* colony showing a green layer with *Prochloron* symbionts inside the ascidian and a violet epizoic biofilm on the underside (scale bar is 5 mm) **b.** Chl *b*-containing *Prochloron* cells found inside the ascidian test (scale bar is 20  $\mu$ m). **c.** Yellow-green patches of Chl *d*-containing *Acaryochloris marina*-like cells found on the lower surface of the ascidian in between patches of violet *Dermocarpa*-like cyanobacteria (scale bar is 20  $\mu$ m). **d.** A patch of *A. marina*-like cells growing on the underside of a *Diplosoma virens* (scale bar is 10  $\mu$ m). **e.** Cells from an *A. marina* culture (scale bar is 10  $\mu$ m) **f.** Spectral absorbance of three biofilm areas with Chl *d*-containing cells growing in an epizoic biofilm below *L. patella*.