Steroid hormones are a large family of cholesterol derivatives regulating development and physiology in both the animal and plant kingdoms, but little is known concerning mechanisms of their secretion from steroidogenic tissues. Here I will present evidence, that in *Drosophila*, endocrine release of the molting hormone ecdysone is mediated through a regulated vesicular trafficking mechanism. Inhibition of calcium signaling in the steroidogenic prothoracic gland (PG) results in loss of spontaneous GCaMP5 positive fluorescent waves in PG cells, the accumulation of unreleased ecdysone, and developmental defects due to deficiency of ecdysone in peripheral tissues. Accumulation of Synaptotagmin-labeled vesicles in the gland is also observed when calcium signaling is disrupted, and these vesicles contain a unique ABC transporter that we show functions as an ecdysone pump to fill vesicles. We propose that trafficking of steroid hormones out of endocrine cells is not always through a simple diffusion mechanism as presently thought, but instead can involve a regulated vesicle-mediated release process.