Diverse Localization Patterns of an R-Type Lectin in Marine Annelids

Abstract

Lectins facilitate cell–cell contact and are critical in many cellular processes. Studying lectins may help us understand the mechanisms underlying tissue regeneration. We investigated the localization of an R-type lectin in a marine annelid (Perinereis sp.) with remarkable tissue regeneration abilities. Perinereis nuntia lectin (PnL), a galactose-binding lectin with repeating Gln-X-Trp motifs, is derived from the ricin B-chain. An antiserum was raised against PnL to specifically detect a 32-kDa lectin in the crude extracts from homogenized lugworms. The antiserum detected PnL in the epidermis, setae, oblique muscle, acicula, nerve cord, and nephridium of the annelid. Some of these tissues and organs also produced Galactose (Gal) or N-acetylgalactosamine (GalNAc), which was detected by fluorescent-labeled plant lectin. These results indicated that the PnL was produced in the tissues originating from the endoderm, mesoderm, and ectoderm. Besides, the localizing pattern of PnL partially merged with the binding pattern of a fluorescent-labeled mushroom lectin that binds to Gal and GalNAc. It suggested that PnL co-localized with galactose-containing glycans in Annelid tissue; this might be the reason PnL needed to be extracted with haptenic sugar, such as d-galactose, in the buffer. Furthermore, we found that a fluorescein isothiocyanate-labeled Gal/GalNAc-binding mushroom lectin binding pattern in the annelid tissue overlapped with the localizing pattern of PnL. These findings suggest that lectin functions by interacting with Gal-containing glycoconjugates in the tissues.