Germ cell development and regeneration in a fully segmented worm, Perinereis nuntia

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論文題目　：Germ cell development and regeneration in a fully segmented worm, *Perinereis nuntia*（多毛類イソゴカイにおける生殖細胞の発達と再生）

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論　文　内　容　の　要　旨

The RNA helicase *vasa* of the dead box family is the most widely used germline marker, to study germ cell development in both vertebrate and invertebrates. The present study examined the expression patterns of *vasa* mRNA at different developmental stages of the Nereidid polychaetes *Perinereis nuntia* (*Pe nuntia*). In adults, *Pn-vasa* was expressed in a large cell cluster at the distal end of the parapodium and in smaller cell clusters (which had an elongated form in the trunk area of the parapodia), and in oocytes in the coelomic cavity. In three-segmented juveniles, *Pn-vasa* was expressed in the parapodia and in the two cells localized in the pygidium. During the addition of a new segment, *Pn-vasa* positive cells in the pygidium increased from two to four and two new *Pn-vasa* positive cells were found in the newly-generated segment. This may suggest that germ cells divide in the pygidium and daughter cells are supplied to the parapodia of the newly-generated segment. Our results unravel a new mechanism of germ cell development in all body segments of *Pe nuntia*. This mechanism of gamete production pattern is different from its close-related species *Pl. dumerilii*. This difference may be attributed to the presence or absence of a complete septum between segments

In a separate study, the gonad regeneration of *Pe. nuntia* was also investigated using the putative germ cell marker *vasa*. Juvenile worms' tails were amputated and the process of gonad regeneration in the parapodia was observed daily. The complete repair of the pygidium was done at 3-day post amputation prior to the addition of a new segment. However, the pygidial cells and the germ cell cluster in the parapodia were obvious at 10-day post amputation. Interestingly, at 3-day post amputations, multiple cells expressing *vasa* coming from cell cluster in the parapodia of the last segment seemed to migrate towards the amputated area, probably to establish the segment addition zone. I hypothesized that these germ cells from the parapodia may help during the segment and gonad regeneration process. Thus, my preliminary result suggests that gonad of *Pe. nuntia* can be regenerated after tail amputation. However, more experiments should be done to confirm my current findings.

Overall, the new mechanism of germ cell distribution discussed in my study will provide baseline information in all fully segmented worms in Phylum Annelida. Likewise, the role of germ cell during the segment repair and gonad regeneration may also provide significant information in the regenerative studies in the future.