Germ cell development in male Perinereis nuntia and gamete spawning mechanisms in males and females

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論文題目　：Germ cell development in male *Perinereis nuntia* and gamete spawning mechanisms in males and females（多毛類イシイソゴカイの雄性生殖細胞の発達過程及び雌雄における配偶子放出機構の研究）

区　　分　：甲

論　文　内　容　の　要　旨

Perinereis nuntia is a fully segmented worm with complete intersegmental septa. A previous study of females revealed that germ cells of this animal originated in the tail end segment, called pygidium. In females, germ cells were duplicated in the pygidium, transferred to a newly generating segment and then settled in the parapodia. Within each segment, the settled germ cells proliferated in the parapodia and then migrated into a body cavity area to begin meiotic development. In respect to the above interesting findings, the present study aimed to describe germ cell development in male *P. nuntia* of which there were no information available until recently. In this study, I analyzed the male germ cell development by *in situ* hybridization with use of germ cell markers, *Pn-piwi* and *Pn-vasa*. The marker signals were first detected in the distal areas of the parapodia on both sides of each segment and formed a large germ cell cluster in each parapodium. The large germ cell cluster separated into smaller clusters and the small clusters migrated to the deeper body cavity area during growth by segment addition. Until the female germ cells began vitellogenesis, it was difficult to identify the sex of germ cells by morphological observations. This morphological similarity suggests that both male and female *P. nuntia* have the same mechanisms of germ cells provision to each segment in early developmental stages.

The second study was conducted to examine the gamete releasing sites in fully segmented worm using the histological techniques. At first, spawning worms were observed closely to determine the area of gamete release. Mature gametes were released from the posterior body region in both males and females. The intersegmental septa between all segments were broken during the characteristic swimming of animals before spawning. The breakage of septa and serpentine swimming allowed gametes to move forward the posterior region. During spawning, sperms were released by splitting/opening of nephridipores at 2^{nd} through 15^{th} segments from the pygidium, while eggs were released through ruptures of skin of 2 – 3 segments between 10^{th} and 30^{th} segments from the tail. Currently, the physiological mechanisms involved in determining the position and constructing gamete releasing sites in fully segmented worm are still unknown. The new findings in this study will provide *P. nuntia* as the good experimental animal for further research.