# A study on *Meloidogyne hapla* secretion fractions that promote karyokinesis in plant cells

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Background & Aim: Root-knot nematodes (RKNs) are parasites that infect plant roots. To establish their successful infection, they induce the change of some plant cells into multinucleate giant cells, which constitute permanent feeding site for the nematodes. In the early phase of giant cell development, karyokinesis occurs in the plant cells. RKNs are thought to secrete some factors to induce the giant cell development. Up to date, many molecules secreted from RKNs have been detected, but the activity of the molecules in plant cells has not been confirmed. The aim of this project was to explore the hypothesis that the manual injection of RKN secretions into plant cells results in the promotion of karyokinesis in the injected plant cells.

Approach: Secretions from RKNs (*Meloidogyne hapla* line VW9) were collected and injected into cultured plant cells (*Nicotiana tabacum* L. cv Bright Yellow 2 cell line) by microinjection method. The injected cells were observed at the time points of 24 hours and 48 hours post injection to check whether karyokinesis occurred in the injected cells.

Results & Discussion: The karyokinesis-promotion activity of RKN secretions was successfully detected by microinjection of RKN secretions into cultured plant cells, which gave the first evidence that RKN secretions really have the ability to increase plant-cell mitotic activity and the secretions were able to function inside plant cells. Moreover, the success in this project provided a powerful assay for investigating the activity of fractionated secretion samples and the identification of secretion fractions that have the karyokinesis-promotion activity.
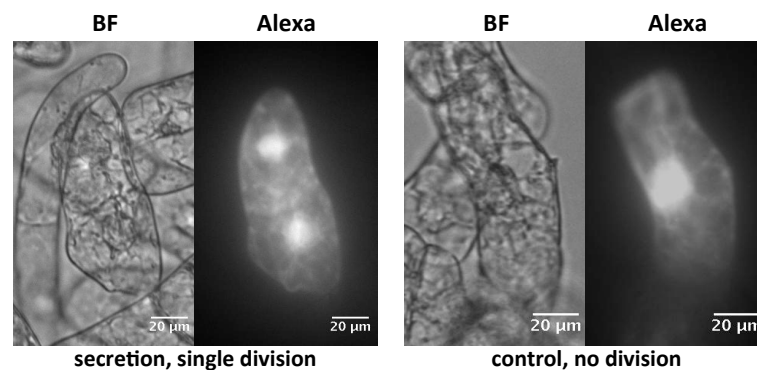
Figure:
The injected cells at 48 hours post injection. The cell injected with RKN secretion sample showed single cell division (left 2 photos), whereas the cell injected with control sample showed no division (right 2 photos). BF means the photo taken in bright field. Alexa means the photo taken with the excitation of injection marker.