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A body dynamics simulation platform for *Caenorhabditis elegans*

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C.elegans has only 302 neurons, and its interconnecting structure has been completely revealed anatomically. *C.elegans* is thus considered as the simplest animal to investigate into primitive information processing mechanisms in neural circuits, and various mathematical models have been proposed. The effects of body dynamics on the information acquisition processes, however, tend to be neglected in the previous studies. Against this background, we propose a simulation platform comprising of environmental, neural, and bodydynamics models. In this simulation platform, the body of *C.elegans* is approximated using a multi-joint rigid link model which can produce dynamic body motion commanded by the neural model. The environmental and neural model can be modified depending on the targeted phenomenon. As an application example of the proposed simulation platform, we analyzed mechanisms of attractant chemotaxis to NaCl. The previous studies revealed that the animal employs pirouette mechanism and weathervane mechanism for the chemotaxis.The two mechanisms respectively require temporal and spatial gradient of NaCl. To discuss the acquisition mechanism of these chemical gradient, we thus defined environmental model to calculate diffusion of NaCl solution on the agar plate, and approximated input-output characteristics of ASE neurons using experimental results of calcium imaging. Response of ASE neurons then can be calculated by providing head coordinate of the body dynamics model. We also assumed a neural model to convert the responses of ASE neurons to temporal and spatial gradient of NaCl and then to command body motion. Finally, results of chemotaxis simulation were compared with the actual animals. Consequently, the attractant chemotaxis was confirmed with chemotaxis index of about 0.7. Based on these results, we are planning for further discussion on the related information acquisition mechanisms.