

グローバル COE 特別セミナー

生物化学専攻セミナー

日時：平成 23 年 8 月 31 日（水） 17:00～18:30

場所：理学部 3 号館 4 階 412 号室

講師：前多 裕介 博士

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演題：Selection of RNA by molecular transport:

A physics approach to the origins of life

要旨：

Atoms and molecules move along a gradient of external fields as seen in electrophoresis. One unexplored but relevant alternative in biology is thermophoresis, the Soret effect, that makes a solute moves along a temperature gradient. We have shown that thermophoresis in a polymer solution can separate and accumulate DNA and RNA with size dependence like gel electrophoresis [1]. In this talk, I show that small RNA can also be selected and separated depending on the folding state by the entropic force gradient. The selection of RNA is affected by its rigidity, which depends on sequence.

Since temperature gradient is ubiquitous in nature, interesting fallout of this effect concerns the origin of life hypothesis near thermal vents where large temperature gradient may select small ribozymes in the pores present in the solid deposits of the vents.

Moreover, this technique has little material dependence that promises a great potential in biology: The manipulation of proteins, Q-dots, living cells and thereby the laser-driven assembly of biological systems inside artificial protocells [2].

[1] Y.T. Maeda, A. Buguin, A. Libchaber (2011) *Physical Review Letters* **107**, 038301.

[2] V. Noireaux, Y.T. Maeda, A. Libchaber (2011) *Proc. Natl. Acad. Sci. USA* **108**, 3473; Y.T. Maeda, et al. submitted.