RIKEN BRC The 164th RIKEN BRC SEMINAR

Strain, diet and litter size effects on mouse meiotic recombination

Dr. Elena de la Casa-Esperon

Professor, University of Castilla-La Mancha, Spain

2023 年 4 月 11 日（火）16:00～16:30

理化学研究所バイオリソース研究センター　森脇和郎ホール

Abstract

Meiotic recombination is well known as a fundamental process that generates genetic diversity and as an essential tool for genetic mapping purposes. But it is also required for proper chromosome segregation. Hence, the frequency and distribution of crossovers are genetically and epigenetically controlled in order to avoid aneuploidy and ensure fertility. We have confirmed that crossover frequency depends on genetic background in spermatocytes of a diverse spectrum of mouse inbred strains.

However, certain environmental exposures can alter crossover frequency, such as toxicants or other stressful conditions. We have found a novel and unexpected factor affecting recombination rate: diet. The effect is both diet- and strain-dependent: while some strains are resistant to drastic nutritional changes, others are sensitive to mild differences between chows commonly used in animal facilities. For instance, a 24-day switch between common chows was sufficient to induce significant changes in the crossover frequency of C57BL/6 adult males.

We have also explored whether early dietary exposures during germline development could have long-term effects on recombination. We chose a murine model of childhood obesity through litter size reduction: mice raised in small litters rapidly gain weight due to overfeeding, compared with animals reared with more siblings. We examined recombination in adult males raised in small litters (4 pups) vs. controls (8 pups per dam). Our results revealed significant differences in the number of crossovers per spermatocyte. We conclude that neonatal overfeeding has long-term effects on meiotic recombination. Our results raise a red flag, as diet and litter size are novel factors that must be controlled and reported in recombination studies. Moreover, they reveal a novel implication of childhood nutrition on adult spermatogenesis.

当セミナーは、学生、研究者、技術者を対象としたものです。
理化学研究所以外からご参加の方は、所属する大学または
研究機関が発行する身分証をご持参になり、守衛所にて
入構証をお受け取りください。

Zoom 聴講可

参加ご希望の方は下記にご連絡ください

info-brc-seminar@ml.riken.jp