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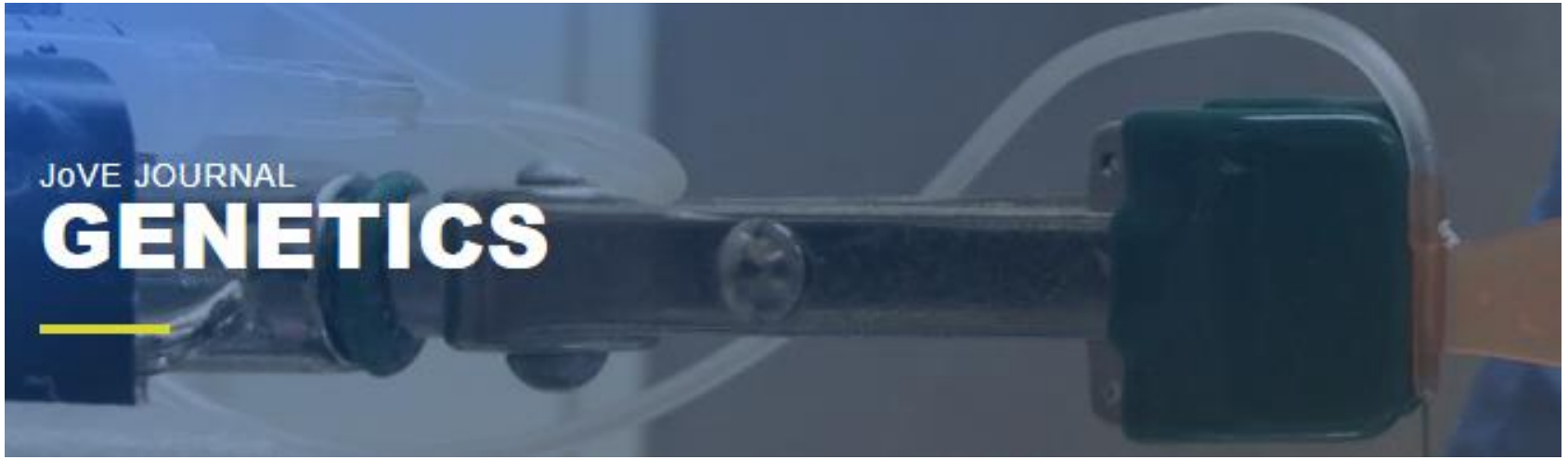


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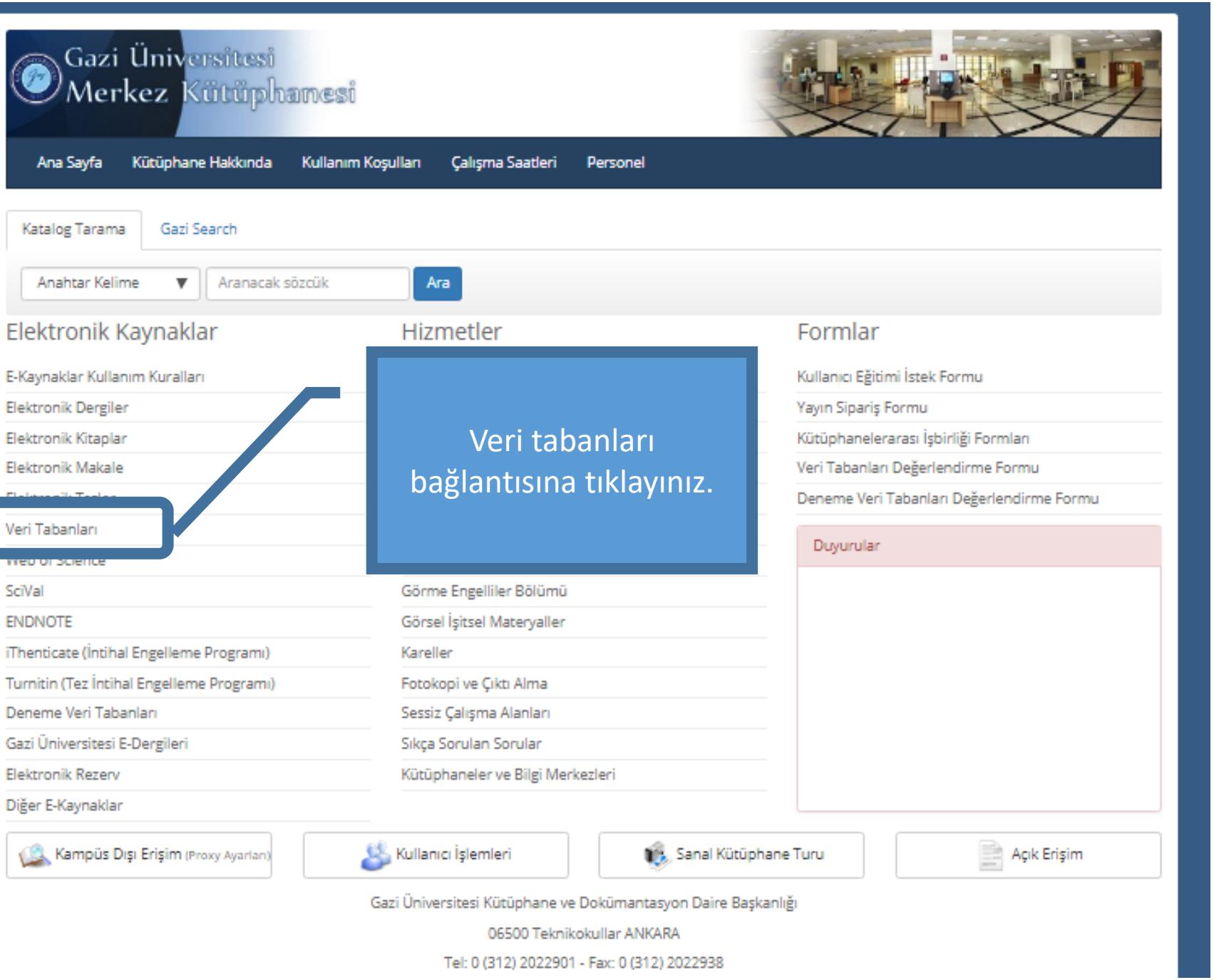
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[1]Department of Biological Sciences, College of Bioscience and Biotechnology, **Chungnam National University**, [2]Department of Pharmacology, College of Medicine, **Chungnam National University**, [3]Department of Nursing, **Gwangju Women's University**

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Tarama sonuç sayfası

**Chromatin Spread Preparations ...cyte Progression from Prophase to Metaphase II**

G...ace ... Hwang*[1]

[1]D...artment of Biochemistry and Molecular Biology, **Johns Hopkins University Bloomberg School of Public**

GENETICS

**Formaldehyde-assisted Isolation of Regulatory Elements to Measure Chromatin Accessibility in Mammalian Cells**

Alfonso Rodríguez-Gil[1], Tabea Riedlinger[2], Olesja Ritter[2], Vera V. Saul[2], M. Lienhard Schmitz[2]

[1]Department of Oncohematology and Genetics. Institute of Biomedicine of Seville (IBiS), **University Hospital Virgen del Rocío**, [2]Institute of Biochemistry, Medical Faculty, Friedrichstrasse 24, Member of the German Center for Lung Research, **Justus-Liebig-University**

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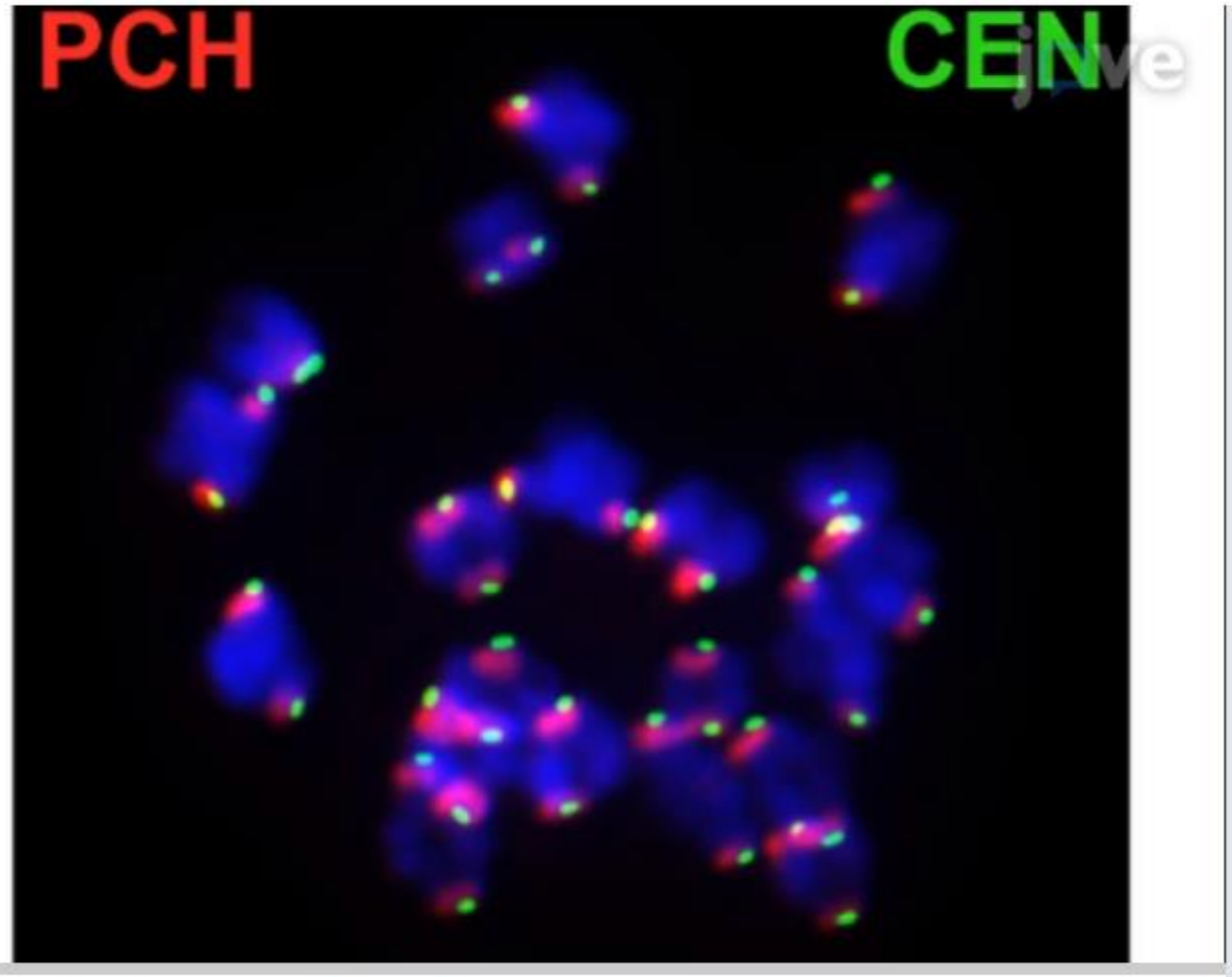


| | |
|---|---|
| 0:04 | Title |
| 0:59 | Harvesting Fetal or Neonatal Ovaries |
| 3:55 | Metaphase I (MI) or Metaphase II (MII) Oocyte Collection |
| 5:17 | Oocyte Denuding and Zona Pellucida Removal |
| 7:05 | MI and MII Oocyte Chromatin Spreads |
| 8:08 | Results: Crossover Formation in C57B/6J Oocytes |
| 9:52 | Conclusion |

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# Chromatin Spread Preparations for the Analysis of Mouse Oocyte Progression from Prophase to Metaphase II

Grace H. Hwang*, Jessica L. Hopkins*, and Philip W. Jordan

rtment of Biochemistry and Molecular Biology, Johns Hopkins University Bloomberg School of Public Health

*These authors contributed equally

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## ABSTRACT

Chromatin spread techniques have been widely used to assess the dynamic localization of various proteins during gametogenesis, particularly for spermatogenesis. These techniques allow for visualization of protein and DNA localization patterns during meiotic events such as homologous chromosome pairing, synapsis and DNA repair. While a few protocols have been described in the litera he timing of meiosis initiation in fetal ovaries. In comparison, dissection. However, it is difficult to obtain a pure synchroniz ons in the juvenile and adult testis. For later stages of meio re oocytes can be collected from adult female mice and stin fetal, neonatal and adult ovaries are described w particularly during MI. These techniques can be oogenesis. As there are distinct differences betw mammalian oogenesis and the sexually dimorph

## INTRODUCTION

During spermatogenesis, large semi-synchronou adulthood[1]. In contrast to males, meiosis in females is initiated solely during fetal development. Following birth, prophase I with an intact germinal vesicle (GV; nuclear envelope) until puberty. At the onset of puberty, a subset maturation, marking the initiation of meiotic resumption. Meiotic resumption in fully-grown oocytes is manifested germinal vesicle breakdown (GVBD). The oocyte then undergoes chromosome condensation and segregation, fo upon progression to MII and are stimulated to complete the second and final meiotic division only after fertilizatio

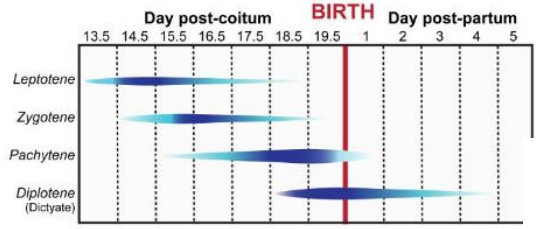
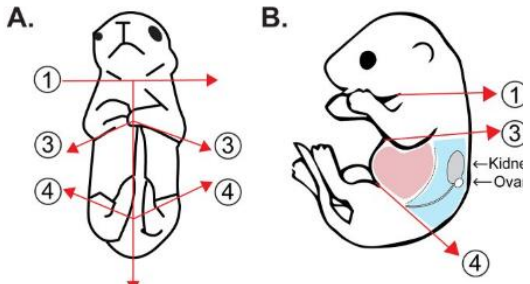
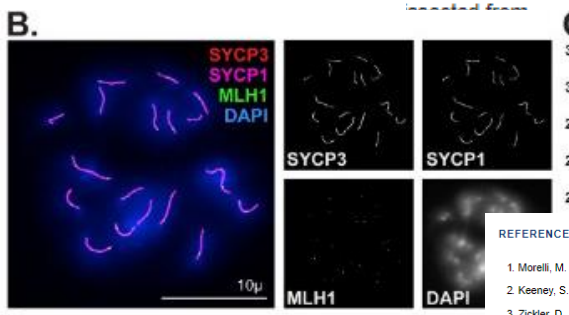
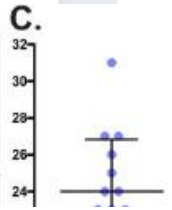
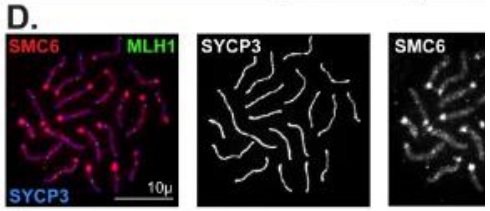


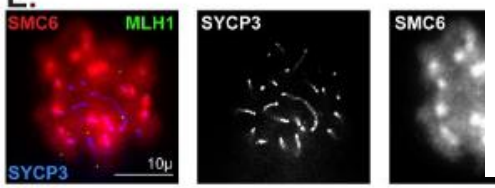

Figure 1: Meiotic prophase timeline during female embryonic and neonatal development. (leptotene, zygotene, pachytene, and diplotene/dictyate stages) observed during embryonic an which the specific prophase sub-stage becomes more abundant. This figure was adapted from

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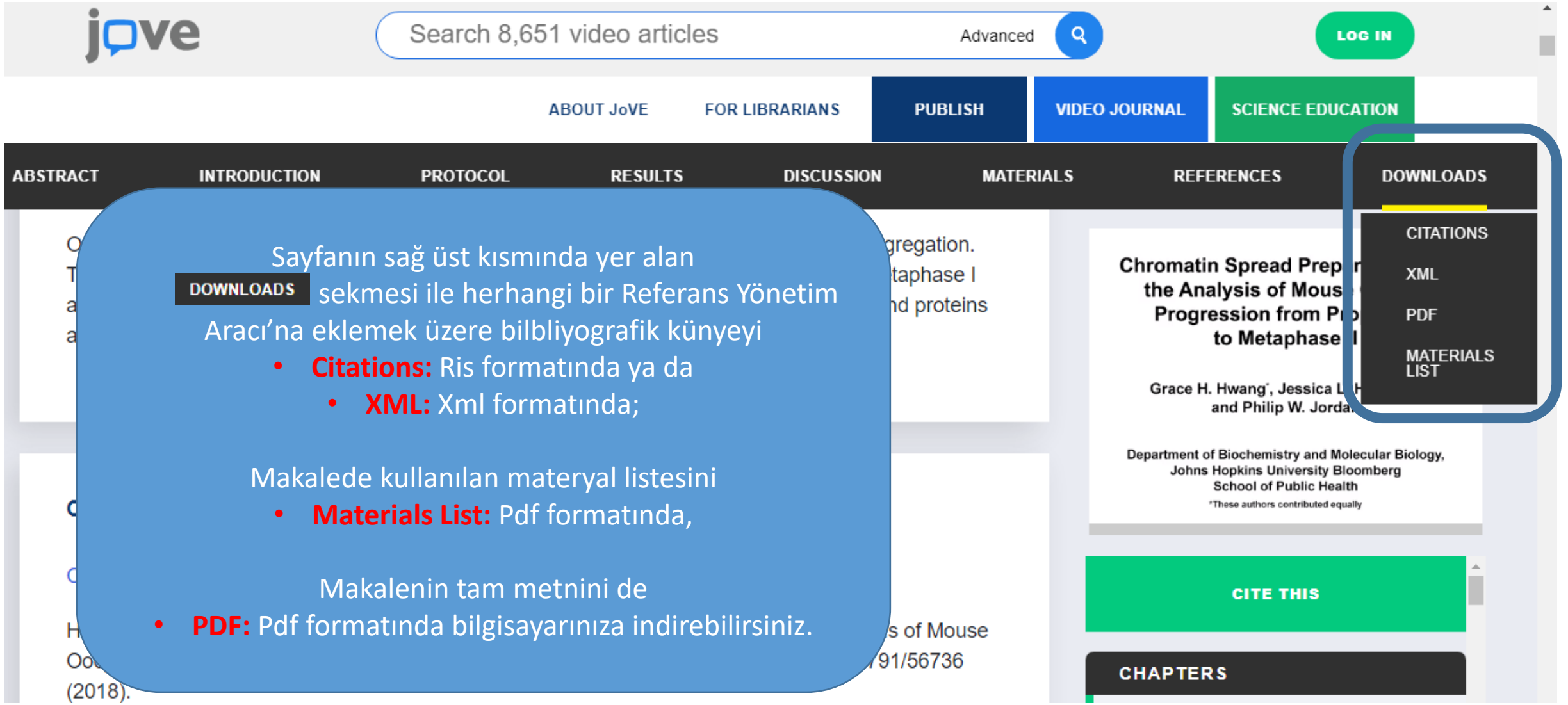
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Grace H. Hwang*[1], Jessica L. Hopkins*[1], Philip W. Jordan[1]
[1]Department of Biochemistry and Molecular Biology, Johns Hopkins University Bloomberg School of Public Health
*These authors contributed equally
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Abstract
Chromatin spread techniques have been widely used to assess the dynamic localization of various proteins during gametogenesis, particularly for spermatogenesis. These techniques allow for visualization of protein and DNA localization patterns during meiotic events such as homologous chromosome pairing, synapsis and DNA repair. While a few protocols have been described in the literature, general chromatin spread techniques using mammalian prophase oocytes are limited and difficult due to the timing of meiosis initiation in fetal ovaries. In comparison, prophase spermatocytes can be collected from juvenile male mice with higher yields without the need for microdissection. However, it is difficult to obtain a pure synchronized population of cells at specific stages due to the heterogeneity of meiotic and post-meiotic germ cell populations in the juvenile and adult testis. For later stages of meiosis, it is advantageous to assess oocytes undergoing meiosis I (MI) or meiosis II (MII), because groups of mature oocytes can be collected from adult female mice and stimulated to resume meiosis in culture. Here, methods for meiotic chromatin spread preparations using oocytes dissected from fetal, neonatal and adult ovaries are described with accompanying video demonstrations. Chromosome missegregation events in mammalian oocytes are frequent, particularly during MI. These techniques can be used to assess and characterize the effects of different mutations or environmental exposures during various stages of oogenesis. As there are distinct differences between oogenesis and spermatogenesis, the techniques described within are invaluable to increase our understanding of mammalian oogenesis and the sexually dimorphic features of chromosome and protein dynamics during meiosis.

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