**Journal Club**

**Presentations in Group Meetings**

As an undergraduate student, I am lucky and proud that I can do presentations in our lab’s group meeting, especially the lab’s journal club.

Till now, I have done 3 presentations in lab’s group meeting.

1. **Architecture of nascent viral fusion (2010.04.12)**

Research techniques: Cryo-electron tomography; time-resolved measures

Research projects: Influenza A virus

Cryo-electron tomography perhaps is the only only available technique to visualize individual protein structures and complexes inside the cell at nano- scale resolution. We could image 3D architecture of loci formed between authentic X31 influenza virons and liposomal membranes under fusogenic conditions. Also the image of the nascent fusion loci at the earliest stages of membrane remodeling can be obtained by cryo-electron tomography. Correlative light and electron microscopic methods make it possible for us to locate and identify specific proteins in vitrified samples.

On a relatively large scale, we’d like to get the general information about fusion and the structure. On a relatively microscopic scale, we’d like to obtain more detail information concerning fusion and contact. Influenza A virus exhibits a complex envelope and glycoprotein coat, which make it difficult for us to design anti-virus drugs. With the help of electron tomography and other techniques, we can go further in the study of fusion and receptor. Thus it’s more likely for us to develop new target site and effective anti-virus drugs.

**My presentation about it is available here** (在here这个词儿这做个链接，把我当时的Presentation挂上去？)

The link of the paper is available here. (文章的链接： http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2857459/)

1. **Cooperation between translating ribosomes and RNA polymerase in transcription elongation (2010.07.26)**

Research techniques: Biochemistry experiments

Research projects: Ribosomes

Based on previous research about how ribosomes indirectly affect RNAP, they came up with several hypotheses. If transcriptional rate relies heavily on translation, then the codon-reading program should determine the rate of RNAP. If the trailing ribosome could control the rate of transcription by pushing backtracked elongation complexes forward, then the ribsomes will inhibit RNAP backtracking and facilitate it read through. To test the above hypothesis, they designed series of biochemistry experiments. Finally, they came to the macromolecular trafficking and cooperation mechanism and found out the direct effects of ribosome on transcription.

**My presentation about it is available here** (在here这个词儿这做个链接，把我当时的Presentation挂上去？)

The link of the paper is available here. (文章的链接：http://www.sciencemag.org/cgi/content/full/sci;328/5977/504?maxtoshow=&hits=10&RESULTFORMAT=&fulltext=Cooperation+between+translating+ribosomes+and+RNA+polymerase+in+transcription+elongation&searchid=1&FIRSTINDEX=0&resourcetype=HWCIT)

1. **Nano-imaging with STORM (2010.09.20)**

Research techniques: STORM, PALM, STED

Related research projects: Microtubes, the whole cell

Multicolor, three dimensional stochastic optical reconstruction microscopy (STORM) makes it possible to image cellular structures with near molecular-scale resolution. STORM is based on detection and localization of each molecular. In a more specific term, it’s based on sequential localization of photo-switchable fluorescent probes, saying Cy5-Cy3 pair dying. Unlike STORM, STED sharpens the point-spread function of the microscopes. Thus they all beyond the diffraction limit.

Furthermore, we could not merely detect proteins or microtubels in vitro, but in vivo, by STORM. Cy5-Cy3 is usually used in STORM. As some cellular structures have 3D architectures, resolving such problems requires high resolution imaging. By astigmatism approach, we could now get three dimensional images of microtubules, even the whole cell.

**My presentation about it is available here** (在here这个词儿这做个链接，把我当时的Presentation挂上去？)

The link of the paper is available here. (文章的链接：<http://www.nature.com/nphoton/journal/v3/n7/full/nphoton.2009.101.html>)

**My Journal clubs**

I have read hundreds of paper in the last year, ranging from cryoEM to viroglogy, from biology to epidemiology.

Here, I’d like to share some of them with you. Hoping you can enjoy it.

1. CryoEM

Joachim Frank, Three-dimensional electron microscopy of macromolecular assemblies- visualization of biological molecules in their native state (Book)

Tanvir R Shaikh, Haixiao Gao *et al*., “SPIDER image processing for single-particle reconstruction of biological macromolecules from electron micrographs”, NATURE PROTOCOLS, VOL.3 NO.12, 2008, 1941- 1974

Ingeborg Schmidt-Kreya, JohnL.Rubinstein, “Electron cryomicroscopy of membrane proteins: Specimen preparation for two-dimensional crystals and single particles”, Micron(2010),doi:10.1016/j.micron.2010.07.004

Andres E. Leschziner1 and Eva Nogales, “Visualizing Flexibility at Molecular Resolution: Analysis of Heterogeneity in Single-Particle Electron Microscopy Reconstructions”

Xuekui Yu, Lei Jin and Z. Hong Zhou, “3.88A° structure of cytoplasmic polyhedrosis virus by cryo-electron microscopy”, Nature letters, Vol 453, 15 May 2008, doi:10.1038

V. Ranmakrishanan, “Ribosome structure and the mechanism of translation”, Cell, Vol. 108, 557–572, February 22, 2002

Monica P. Hui *et al.*, “ParA2, a Vibrio cholerae chromosome partitioning protein, forms left-handed helical filaments on DNA”, P.N.A.S, doi:10.1073, 2010 Jan 26

1. Techniques\_ STORM

X. Zhuang, "Nano-imaging with STORM", Nature Photonics 3, 365-367 (2009)

B. Huang, M. Bates, X. Zhuang, "Super-resolution Fluorescence Microscopy", Annual Review Biochemistry 78, 993-1016 (2009)

B. Huang, S.A. Jones, B. Brandenburg, X. Zhuang, "Whole-cell 3D STORM reveals interactions between cellular structures with nanometer-scale resolution", Nature Methods 5, 1047-1052 (2008)

M. Bates, B. Huang, X. Zhuang, "Super-resolution microscopy by nanoscale localization of photo-switchable fluorescent probes", Curr. Opin. Chem. Biol. 12, 505-514 (2008)

B. Huang, W. Wang, M. Bates, X. Zhuang, "Three-dimensional Super-resolution Imaging by Stochastic Optical Reconstruction Microscopy", Science 319, 810-813 (2008)

M. Bates, B. Huang, G. T. Dempsey, X. Zhuang, "Multicolor Super-Resolution Imaging with Photo-Switchable Fluorescent Probes", Science 317, 1749-1753 (2007)

M. J. Rust, M. Bates, X. Zhuang, "Sub-diffraction-limit imaging by stochastic optical reconstruction microscopy (STORM)", Nature Methods 3, 793-795 (2006)

1. Epidemiology& Virology

Daniel M. Weinberger *et al.*, “Epidemiologic Evidence for Serotype-Specific Acquired Immunity to Pneumococcal Carriage” The Journal of Infectious Diseases 2008; 197:1511– 8

Marc Lipsitch *et al.*, “Negative Controls, A Tool for Detecting Confounding and Bias in Observational Studies”, Epidemiology, Volume 21, Number 3, May 2010

Lisa A Jackson *et al*, “Evidence of bias in estimates of influenza vaccine effectiveness in seniors”, International Journal of Epidemiology 2006;35:337–344

Darius Moradpour, François Penin and Charles M. Rice, “Replication of hepatitis C virus”, NATURE REVIEWS MICROBIOLOGY, VOLUME 5, JUNE 2007, 453-463

Matthew J. Evans *et al*, “Claudin-1 is a hepatitis C virus co-receptor required for a late step in entry”, Nature Letter, Vol 446, 12 April 2007,doi:10.1038

In-Ja L. Byeon *et al*, “Structural Convergence between Cryo-EM and NMR Reveals Intersubunit Interactions Critical for HIV-1 Capsid Function”, Cell 139, 780–790, November 13, 2009