Xin Guan

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Education

School of Science, Beijing Jiaotong University (BJTU) 09/2015-06/2019

- Program: B.S. in Bioinformatics (Overall GPA: 3.92/4.0; Major GPA: 3.93/4.0)

Research Experience

Verification of lncRNA and circRNA in Osteogenic Differentiation Based on Next-generation Sequencing 06/2018-06/2019

Assisted in completing the following tasks:

- Utilized BMP-2(bone morphogenetic protein 2) to induce MC3T3E1 cell to differentiate into osteoblast
- Obtained 48687 mRNAs and 1806 annotated lncRNAs after extracting RNA fragments from experimental group and control group by high-throughput sequencing
- Gained 171 lncRNAs and 55 circRNAs which could be expressed differentially in the process of osteogenic differentiation

Independently accomplished the following tasks about LncRNAs:

- Looked for the pairs of mRNA and LncRNA which were differentially expressed during osteogenic differentiation and had co-location and co-expression relationship with each other
- Selected the ENSMUST00000145585.1(LncRNA) and Optn(mRNA) as experimental objects from the candidates by employing several standards, like the relationship between gene and bone related metabolic processes, p-value etc.
- Formed several assumptions of the interaction between Optn and ENSMUST00000145585.1 by predicting subcellular localization of ENSMUST00000145585.1, comparing the positional relationship between each transcript of Optn and ENSMUST00000145585.1 and forecasting the binding of ENSMUST00000145585.1 and Optn protein
- Adopted the sequence of ENSMUST00000145585.1 to construct a plasmid and transfect the C2C12 cells
- Detected the result of overexpression by real-time quantitative PCR
- Measured the expression of Optn by real-time quantitative PCR and Western Blot

Independently finish the following tasks about circRNAs:

- Chose the mmu_circ_0000104 as the experimental object according to p-value
- Designed the primers to detect the expression of the mmu_circ_0000104

Obesity Related SNP Detection Penal 07/2019-now

- Searched GIANT database and papers for discovering SNP associated with obesity from different samples through GWAS and partly data from UCSC by R
- Gained basic information from GWAS Catalog database, including SNP-risk allele, initial sample size, related gene, OR/beta, disease/treat etc.
- Formed a standard to evaluate the SNP including p-value, race, sample size and other terms with different score
- Screened out the top 40 as research objects and designed different kinds of primers for each of them for different experiments like SYBR-Green and Taq-Man, and weigh efficiency of each method against its market value
- Formed an obesity scoring system by using OR-GRS to assign weight to each SNP

Tuberculosis (TB) Related SNP Detection Penal 07/2019-now

- Constructed and improved the literature screening system for tuberculosis biomarkers, on the basis of the related literature
- Screened thousands of literature that meet the requirements and summarized the information of biomarkers
- Constructed a mathematical model to comprehensively evaluate several aspects of a biomarker, such as correlation of a biomarker with tuberculosis and the reliability of the data
- Selected Top 10 biomarkers as candidate for latter experiments

Lung Cancer Gene Detection Panel by Using Circulating Tumor DNA in Peripheral Blood 07/2019-now

- Searched TCGA database and papers for finding lung cancer related genes and collected information about their functions (cancer suppressor gene or proto-oncogene) and action modes (mutation/fusion/methylation/transcript variants/SNP/exon skipping) as well as the sub-types of lung cancer

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Core Course Projects

Genomics (A+) 06/2018

- Made GWAS (Genome Wide Association Study) to analyze the genes related to "Milk fat percentage" of cattle by R language in Linux operating system

Bioinformatics Software and Its Application (A+) 09/2017-01/2018

- Wrote applets via Perl and Shell in Linux OS to calculate the solvent accessibility of each amino acids of a great number of antibodies by batch download
- Coded procedure in Perl to transform the coordinates of two antibodies and to make their important position coordinates overlap for further analysis of their similarities and differences which is showed by the PyMOL Viewer

Papers

- Yong Liu, Qian-Huan Yao, **Xin Guan**, Bo Tian, Ning Chen, Shuai-Shuai Niu, Xu Cheng, Hong-Gang Hu, Hong-Wen Deng, Li-Shu Zhang, "*Mining for Novel Obesity-associated Genes by Integrating PPI Network Analysis with Differential Gene Expression Profiling*," SCI (to be published)
- **Xin Guan** et al., "*Study on the lncRNA of Differential Expression during Osteogenic Differentiation*"(under preparation)
- **Xin Guan** et al., "*Prediction and Verification of circRNA Function*" (literature review, under preparation)
- **Xin Guan** et al., "*A Way to Identify and Detect circRNA & the Application of Relevant Databases*" (literature review)

Honors & Awards

- Honorable Mention, Mathematical Contest in Modeling (MCM) (30%) 04/2018
- Successful Participant, China Undergraduate Mathematical Contest in Modeling 09/2017
- The 3nd Prize of Merit-based Scholarship (1/25), BJTU 09/2017-07/2018
- The 2nd Prize of Merit-based Scholarship (1/10), BJTU 09/2016-07/2017
- Merit Student, BJTU 09/2016-07/2017

Extracurricular Activities

Internship

Research assistant, Chengdu Norson Clinical Laboratory Co. Ltd. 07/2019-07/2020

- Completed biological information related work in several tasks like obesity related SNP detection penal, lung cancer gene detection panel and a study of the association between lung cancer and tuberculosis

Assistant, Beijing Branch of China Mobile Communication Corporation Terminal Co. Ltd. 07/2017-08/2017

- Organized and analyzed data; sorted, summarized and archived documents; purchased and tidied office supplies

Intern, Social Practice of BJTU Enrollment Propaganda 12/2016-02/2017

Leadership

Minister, Publicity Department of Party Committee (work-study program), BJTU 09/2017-now

- Assigned work, interviewed outstanding students, wrote paper, checked campus newspaper and made its layout

Vice-minister, Science and Technology Association, BJTU 09/2016-06/2017

- Held about 5 activities, like Teach-in of Student Research Training Program (over 1000 attendants), Encyclopedia Knowledge Contest for all students in BJTU, etc.; looked for members to build BJTU scientific research team

Volunteer

Field Personnel, China Heart Congress 2017 in Conjunction with the 2nd Annual China Vascular Congress 08/2017

Volunteer Guide in Fragrant Hill (twice) 05/2017&10/2016

Excellent Volunteer, called on passersby to donate money to buy stationeries for children in remote area 10/2016-11/2016

Expertise

- **Biological Experiments:** cell culture, subculture, RNA extraction, RT-PCR (reverse transcription-polymerase chain reaction), protein concentration measurement with BCA (bicinchoninic acid), western blot experiment
- **Professional Skills:** GWAS (genome wide association study); design primers for the normal gene, SNP (single nucleotide polymorphism), methylated gene; mathematical models construction; data analysis
- **Computer Skills:** C language, SQL, Perl, Shell Command Language, R language, Python; Linux operation system