Summer Week 1 (8.6-8.12)

Aims for this week

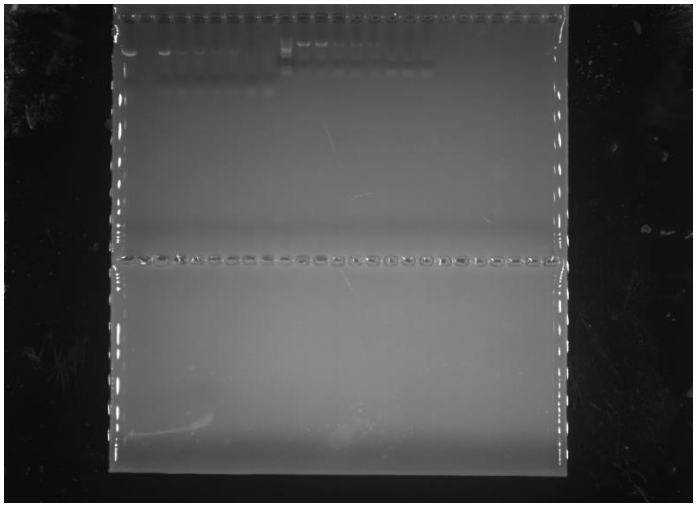
Wet Lab

①Transform the competent cells with specific Biobricks and preserve the cells in -80℃ environment

(1.2.3.4 already have/1.2.3.5/1.2.3. A /1.2.3. B /1.2.3. C /1.2.3. D /1.2.3. E /1.2.3. F)

②Find the proper protocol of light-sensing cell culture

③Construct plasmid by Gibson Assembly



Hardware

①Build a hardware which can change the wavelength of single light and project to LB medium

Human practice

①Attend the meeting organized by Peking and communicate with other teams

②Invite Professor Liu to give a lecture about art and science in China Science and Technology Museum

Tuesday 7th August

Human Practice – Meetup

Aim: Attend a meeting organized by Peking University team.

Result: We presented our project to other 5 teams including Peking, BNU, OUC, Tsinghua and BIT, we also listened to their presentations and communicated with other iGEMers. Sharing ideas and discussing problems gave us a deeper insight of our own project and more opportunities to collaborate with other teams.

Wet lab – Transformation

Aim: Transform cells with 3,5, A, B, C, D, E, F plasmids and competent cells of 1,2 plasmids.

Result: Incubated overnight.

Wednesday 8th August

Wet lab

①Check

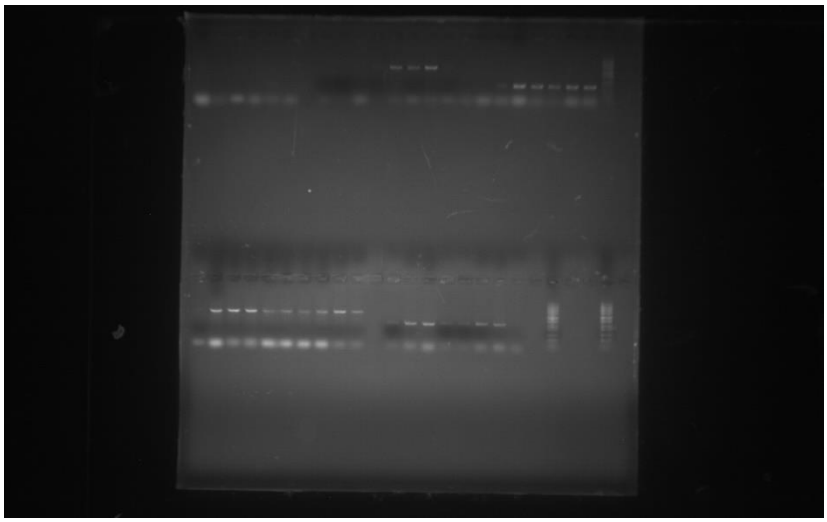
Aim: Check the cells we transformed yesterday.

Result: 1.2.3.C, 1.2.3.E and 1.2.3.F cells grew in independent colony.

②PCR reaction

Aim: Set up a PCR reaction to verify if the plasmids had been transformed correctly.

Result: 1.2.3.E and 1.2.3.F transformations were successful.



③Transformation

Aim: Transform cells with 3,5, A, B, C, D plasmids and competent cells of 1,2 plasmids.

Result: Incubated overnight.

④Incubation in green light

Aim: Expose 1.2.3.4 cells to green light to see the florescent intensity.

Result: Incubated overnight.

Thursday 9th August

Human practice

Aim: Sent an e-mail to Pro. Liu to invite him to give a lecture about art and science in China Science and Technology Museum.

Result: We received the reply from Pro. Liu and be informed that he was willing to accept our invitation.

Wet lab

①Check

Aim: Check the plates have grown after yesterday's transformation

Result: Discovered colonies of 1.2.3.5, 1.2.3.B and 1.2.3.D cells. We picked colonies of these three cells and inoculated in 96-well micro-immunoplate. But after 3-hour-incubation in shaker, only 1.2.3.D cells grew smoothly.

②PCR reaction

Aim: Set up a PCR reaction and demonstrated that the transformation was successful.

Result: Success.

③Cell preservation

Aim: Preserve 1.2.3.E/1.2.3.F cells

Result: Success. We mixed the 1.2.3.E / 1.2.3.F cells with 60% glycerin to preserve them in -80℃ environment.

④Light experiment result check

Aim: Check the plate which exposed to green light overnight.

Result: Fail. There is only slight difference of fluorescence intensity between shading cells and

the ones exposed to light.

⑤streak plate

Aim: Get an initial ideal result.

Result: Made three streak plate and incubated overnight.

Friday 10th August

Wet lab

①Light experiment

Aim: Get an initial ideal result.

Result: We picked one of the three streak plate to incubate in green light for 18 hours. We picked the colonies in one of the other two plates, inoculated in LB medium and incubated in shaker. For the left plate, we kept it in 37℃ incubator for continuous incubation.

②Cell Competency

Aim: Improve the efficiency of transformation

Result: Make new competent cells of 1.2.3 plasmids.

③Transformation

Aim: Transform cells with 3,5, A, B, C, D plasmids and competent cells of 1,2 plasmids.

Result: Incubated overnight.

Modeling

Aim: Get a series of information for our first model for growth curve.

Result: We measured bacterial concentration and OD every 1 hour for the initial 6 hours and every 0.5 hour for the following hours.

Human Practice

Aim: Finish the basic design of our 3 minutes video of science video.

Result: Success. We were going to change our idea into a fancy short video about science. Fermentation was the theme of our video for this year.

Meeting

Aim: Specify tasks during the following week and summarize what we have accomplished this week.

Result: Success.

Saturday 11th August

Wet lab

Aim: Check the plates have grown after yesterday's transformation

Result: Success. All grew well in the plate, which indicated our high efficiency of transformation and reliability of competent cells. We picked 2 colonies from each plate, inoculated in LB medium respectively and incubated overnight.

Modelling

Aim: Work on collecting basic laboratory data for growth curve.

Result: We tried to find the relationship between the concentration and OD.

Sunday 12th August

Wet lab

Aim: Preserve 1.2.3.5/1.2.3.A/1.2.3.B/1.2.3.C cells.

Result: We mixed the cells incubated yesterday with 60% glycerin and preserved them in -80℃ environment.

Human Practice

Aim: Finish the design of our online game's plotline.

Result: Success. In this game, your role was one of the UCAS iGEMers, you would experience a series of game events and every choice you made would influence the result. Could you overcome all the difficulties to become a qualified iGEMer and success to attend the jamboree? Let's wait the game be out!

Summer Week 2（8.13-8.19）

Aims for this week

Survey

①Design a market survey.

②Go through documents to make a time line.

Wet lab

①Finish the construction of AHL system plasmids and other aroma DNA plasmids.

②Find the protocol of solid and liquid environment experiment.

Modelling

①Finish the growth curve

②Give the plan and requirements of the following modelling work.'

Human practice

①Prepare for the application for the Science Popularization Day events.

②Translate the online game

③Prepare for the second episode of our science popularization video.

Monday 13th August

Wet lab

①Transformation

Aim: Transform the DNA of lemon aroma (From iGEM Kit 12L) into DH-5α competent cells.

Result: Incubated overnight.

②Incubation

Aim: Amplification culture of cells expressing aeBlue, eforRed and AmilGFP.

Result: Pick the colonies, inoculated in LB medium and incubated overnight.

Hardware

Aim: Use LED lights of different wavelengths, LED driver and an opaque box to build our hardware version 1.0.

Result: Success. This simple system was able to give out light for more than 10 hours continuously and set the LED in three different intensities.

Modelling

Aim: Process experimental data to make a growth curve.

Result: Success. Used MATLAB to finish.

Meeting

Aim: Specify tasks during the following week and summarize what we have accomplished this week.

Result: Success.

Tuesday 14th August

Wet lab

①Check

Aim: Check the cells we transformed yesterday.

Result: Success. We get 12L single colonies.

②Preservation

Aim: Preserve 12L, aeBlue, eforRed and AmilGFP cells.

Result: Success.

③Plasmid extraction

Aim: Extract 12L, aeBlue, eforRed and AmilGFP plasmids and preserve in -20℃.

Result: Success.

④Light experiment

Aim: Test the response of florescent protein and LacZ.

Result: Gradient dilute the bacterial fluid and spread plates, expose in red light or green light or keep dark, incubate overnight.

Hardware

Aim: Build another green light system and shunt it with the former one.

Result: Success.

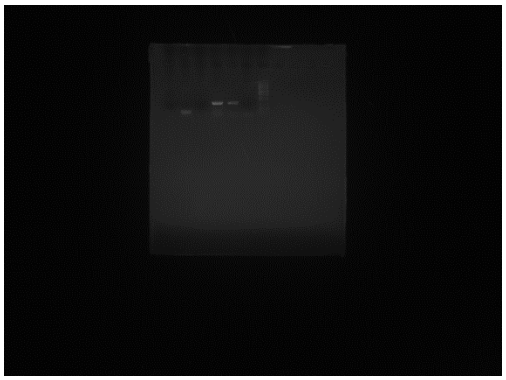
Wednesday 15th August

Wet lab

①Gibson Assembly

Aim: Using Gibson Assembly to connect aeBlue, eforRed and AmilGFP genes.

Result: Set PCR several times and finally get segments we want.



②Light experiment (plate)

Aim: Test 1.2.3.4 cells' response to blue (nm), green (nm) and yellow (nm) light.

Result: Incubate overnight.

③Light experiment (fluid)

Aim: Compare differences between 1.2.3.4/1.2.3.5 cells picked from plate and bacterial fluid. Incubate the cells in 96-well plate, under green/blue light overnight.

Result: Incubate overnight.

Hardware

Aim: Build 2 new system of blue and orange light.

Result: Success.

Modelling

Aim: Use 1.2.3.A/B/C/D/F/5 cells to collect experimental data for growth curve.

Result: Continue.

Thursday 16th August

Wet lab

①Transformation

Aim: Transform chromoprotein plasmid into 1.2.3 competent cells.

Result: Success.

②OD and florescent intensity

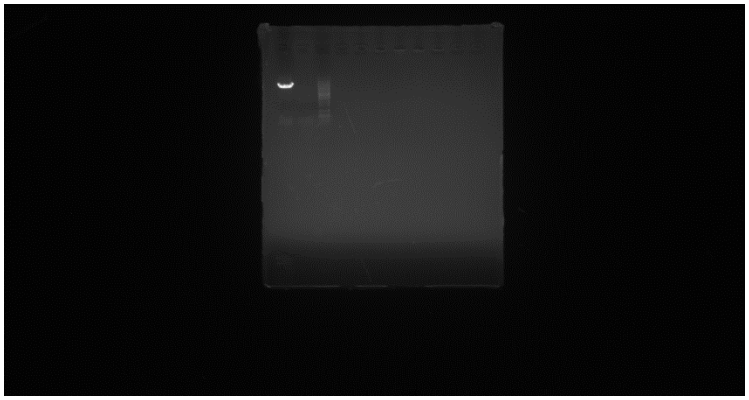
Aim: Check the OD and florescent intensity of 1.2.3.4 fluid.

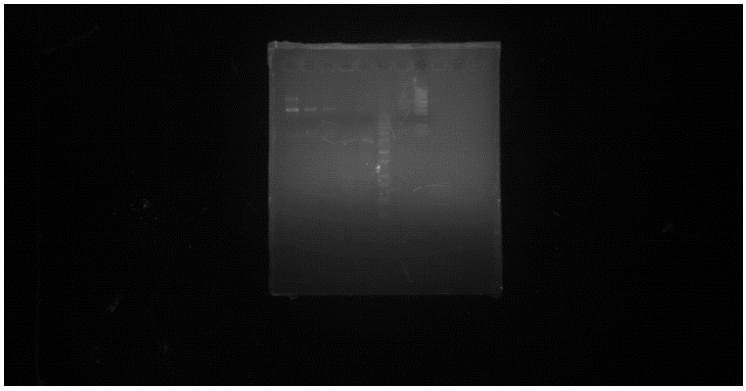
Result: Collect data and analyze. Green group doesn't have evident result, but the data of blue group deserves further analysis.

③Gibson Assembly

Aim: Using Gibson Assembly to connect aeBlue, eforRed and AmilGFP gene segments.

Result: Further experiment.





④Light experiment (plate)

Aim: Test 1.2.3.4 cells' response to purple (430-440nm), far red (655-660nm), orange (600-605nm) and green (515-530nm) light.

Result: Incubate overnight.

⑤Check

Aim: Check 1.2.3.4 cells' response to blue (460-470nm), green (515-530nm) and yellow (590-595nm) light. (Plate)

Result: Blue and yellow groups are successful, but green one fails.

Modelling

Aim: Use 1.2.3.A/B/C/D/F/5 cells to collect experimental data for growth curve.

Result: Continue.

Friday 17th August

Wet lab

①Gibson Assembly

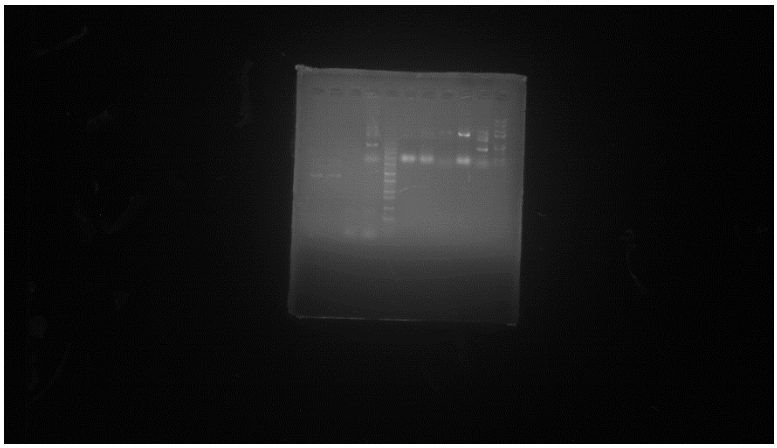
Aim: Transform the product into DH-5α competent cells.

Result: Incubate overnight for further verification

②Amplify the chromoprotein genes

Aim: Set PCR reaction to amplify the eforRed, aeBlue and AmilGFP vectors, fwYellow, aeBlue and AmilGFP segments.

Result: Partly success. Some segments need gel extraction purification.



③Light experiment

Aim: Use red (620-630nm), green (515-530nm), yellow (590-595nm) and purple (420-430nm) light to repeat the plate experiment, hoping to get a stable result.

Result: Incubate overnight.

Modelling

Aim: Upgrade the hardware for fluid. Connect 4 LED in series, we can incubate 4 96-well plates of cells at the same time.

Result: Success.

Saturday 18th August

Wet lab

①Check

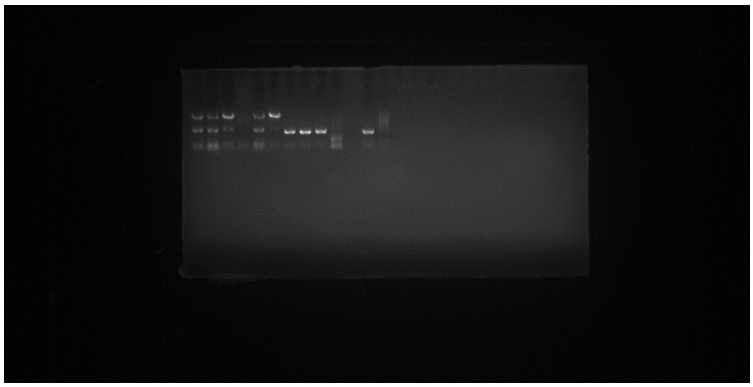
Aim: Check red (620-630nm), green (515-530nm), yellow (590-595nm) and purple (420-430nm) light. (Plate)

Result: Success. Take photos.

②Construct tandem chromoprotein gene plasmid

Aim: Purify the gene segments we get and use Gibson Assembly to connect them.

Result: Transform 6 plasmids into DH-5α cells, incubate overnight.



③Prepare for CRISPR

Aim: Set PCR reaction to amplify sgDNA segment and dCas9 segment. Test the efficiency of two primers of dCas9 segment. Transform into DH-5α cells.

Result: Incubate overnight.

④Light experiment

Aim: Use purple (390-400nm), plant blue (450-455nm), blue (460-470nm) and blue green (500-505nm) light to repeat the plate experiment.

Result: Incubate overnight.

Modelling

Aim: Set a module to analyze the spatial differences of light intensity inside the hardware

Result: Collect a series useful data.

Sunday 19th August

Wet lab

①Check

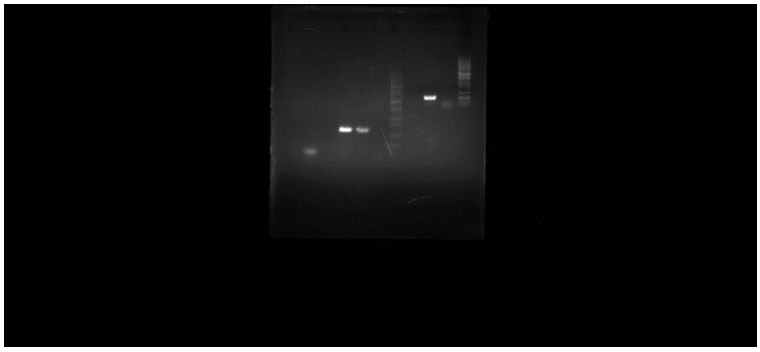
Aim: Check purple (390-400nm), plant blue (450-455nm), blue (460-470nm) and blue green (500-505nm) light. (Plate)

Result: Success. Take photos.

②Construct tandem chromoprotein gene plasmid

Aim: Pick the colonies to set PCR reaction.

Result: Only 2 of 6 have correspondent stripe.



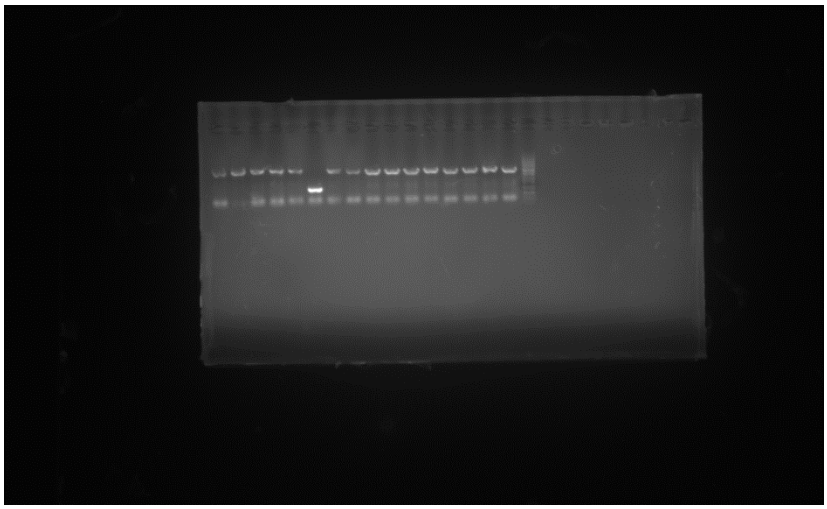
③Light experiment

Aim: Use orange-red (600-605nm), blue-green (515-530nm), plant-red (655-660nm) and purple (420-430nm) light. (Plate) to repeat the plate experiment. Also, we begin to use 1.2.3.5

cells, rose-gluc, X-gal and Tryptophan to test the enzyme system.
Result: Incubate overnight.

④Prepare for CRISPR

Aim: Get pTarget segment
Result: Success



Human Practice

Aim: Make schedule and divide tasks
Result: Well prepared for the following weeks.

Summer Week 3（8.20-8.26）

Aims for this week

Wet lab

①Finish the synthesis of DNA segments for ordor plasmids.
②Light experiment for enzyme system
③Collect and analyze the photos we got of fluorescent protein system

Modelling

①Analyze relationship between OD, light intensity and fluorescent protein

Hardware

①Built a model to improve our hardware
②Bought new material for the second version hardware

Human practice

①Interview
②Prepare for the video for 3 Minutes for Science

Monday 20th August

Wet lab

①Light experiment

Aim: Test the response of florescent protein and chromoprotein.
Result: Further analysis.

②Incubation

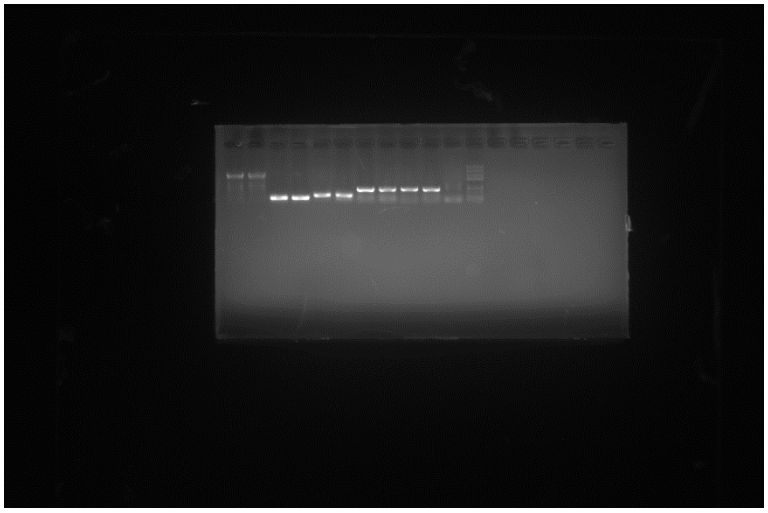
Aim: Amplification culture of cells expressing aeBlue, eforRed and AmilGFP.

Result: Pick the colonies, inoculated in LB medium and incubated overnight.

③Gibson Assembly

Aim: Using Gibson Assembly to construct chromoprotein plasmid.

Result: Further experiment.



④Construct parts

Hardware

Aim: Bought new material for the second version hardware

Result: Success.

Modelling

Aim: Data analysis.

Result: Further analysis.

Human Practice

Aim: Prepare for interview with Prof. LIU from IBP.

Result: Success.

Tuesday 21st August

Wet lab

①Light experiment

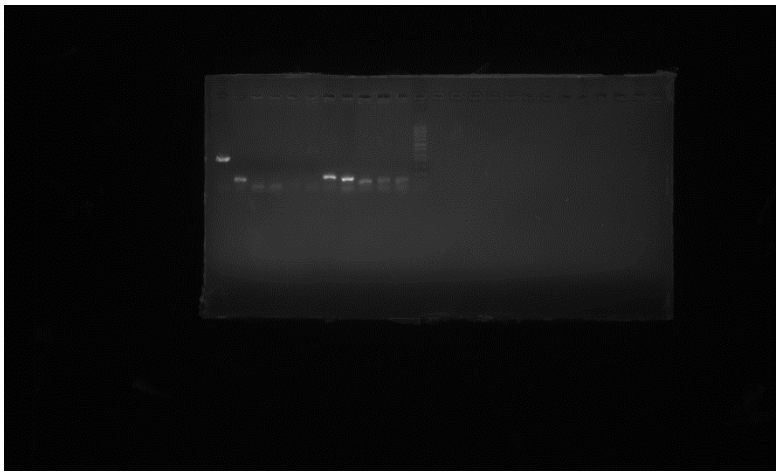
Aim: Test the response of florescent protein and chromoprotein.

Result: Further analysis.

②PCR amplification of tandem chromoprotein

Aim: Construct tandem chromoprotein segment

Result: Further Experiment



③Preservation

Aim: Preserve cells.

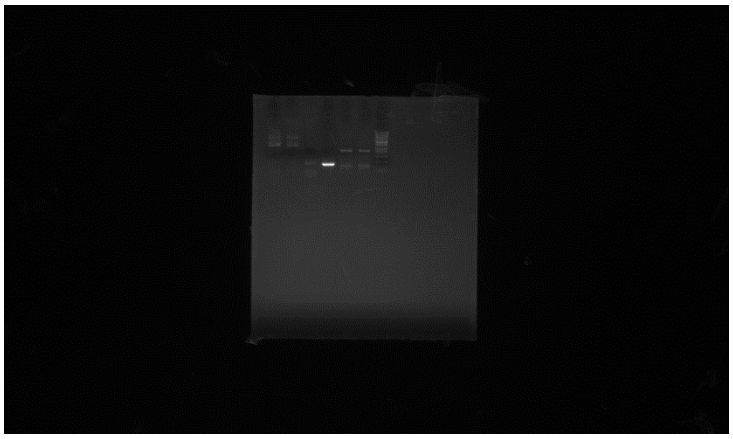
Result: Success.

④Construct parts

⑤Gibson Assembly

Aim: Construct tandem chromoprotein segment

Result: Further Experiment



Human Practice

Aim: Have interview with Prof. LIU from IBP.

Result: Success.

Wednesday 22nd August

Wet lab

①Light experiment

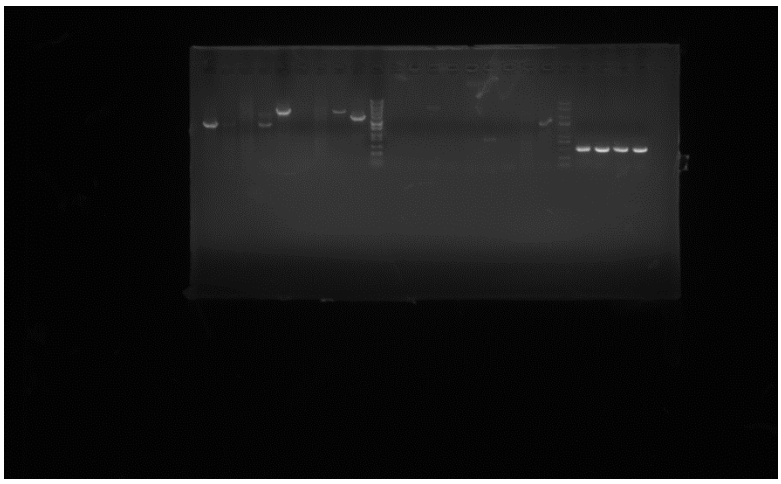
Aim: Test the response of florescent protein and chromoprotein.

Result: Further analysis.

②PCR amplification of tandem chromoprotein

Aim: Construct tandem chromoprotein segment

Result: Further Experiment



③Gibson Assembly

Aim: Using Gibson Assembly to construct chromoprotein plasmid.

Result: Further experiment.

④Construct parts

Hardware

Aim: Prepare new material for the second version hardware

Result: Success.

Human Practice

Aim: Record interview with Prof. LIU from IBP.

Result: Success.

Thursday 23rd August

Wet lab

①Light experiment

Aim: Test the response of florescent protein and chromoprotein.

Result: Further analysis.

②PCR amplification of tandem chromoprotein

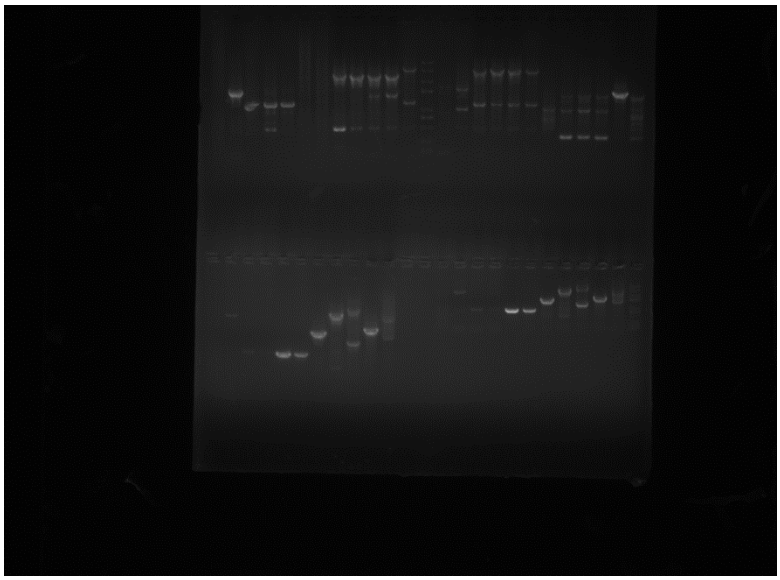
Aim: Construct tandem chromoprotein segment

Result: Further Experiment

③Amplify all cells we get

Aim: Amplify 1234/1235/JF1 cells and 12/123 competent cells, to prepare for further experiment.

Result: Further analysis.



④Construct parts

Friday 24th August

Wet lab

①Light experiment

Aim: Test the response of florescent protein and chromoprotein.

Result: Further analysis.

②PCR amplification of tandem chromoprotein

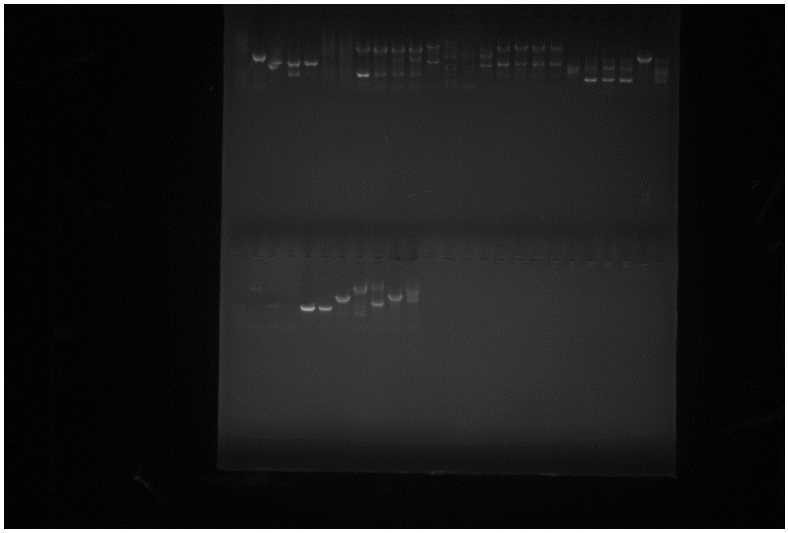
Aim: Construct tandem chromoprotein segment

Result: Further Experiment

③Amplify all cells we get

Aim: Amplify 1234/1235/JF1 cells and 12/123 competent cells, preparing for further experiment.

Result: Finished.



④Construct parts

Modelling

Aim: Analyze relationship between OD, light intensity and fluorescent protein.

Result: Further analysis.

Hardware

Aim: Built a model to improve our hardware.

Result: Further analysis.

Saturday 25th August

Wet lab

①Light experiment

Aim: Test the response of florescent protein and chromoprotein.

Result: Further analysis.

②Synthesis

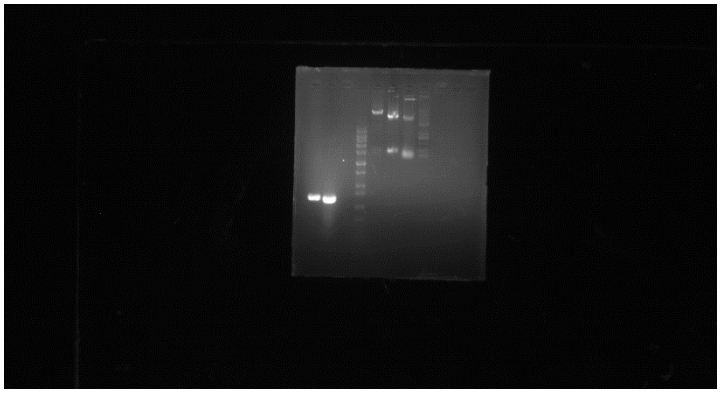
Aim: Synthesize PAI gene

Result: Further Experiment

③Gibson Assembly

Aim: Using Gibson Assembly to construct chromoprotein plasmid.

Result: Further experiment.

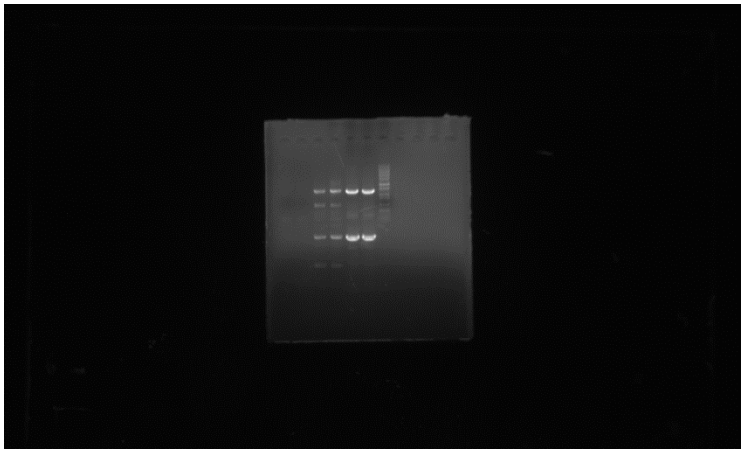


④Construct parts

⑤PCR amplification of PAI and Rain

Aim: Amplify PAI and Rain

Result: Further Analysis



Modelling

Aim: Data analysis.

Result: Further analysis.

Hardware

Aim: Built a model to improve our hardware.

Result: Finished.

Sunday 26th August

Wet lab

①Light experiment

Aim: Test the response of florescent protein and chromoprotein.

Result: Further analysis.

②DNA sequencing

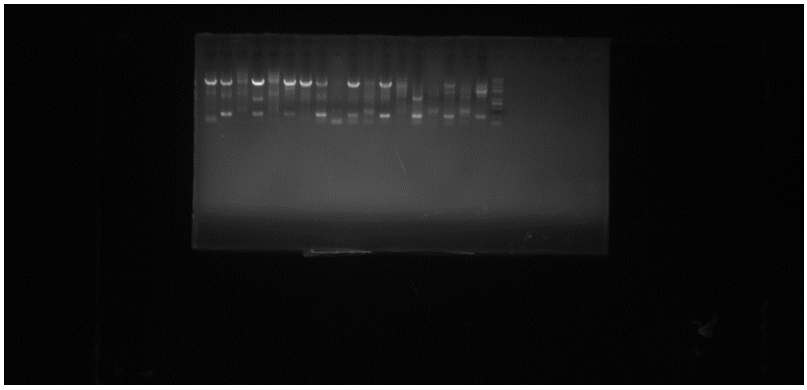
Aim: Sequence PAI gene.

Result: Waiting for result.

③Gibson Assembly

Aim: Using Gibson Assembly to construct chromoprotein plasmid.

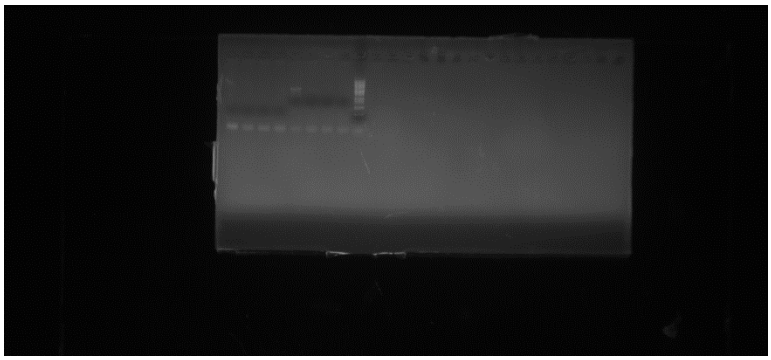
Result: Further experiment.



③Amplify 4.5 plasmid

Aim: Amplify pJF11467, pJF11468 plasmid, trying to find the reason for unsmooth light experiment.

Result: No predominant stripe. Further analysis.



④Construct parts

Human Practice

Aim: Design of 3 Minutes for Science

Result: Finished

Hardware

Aim: Make improvement of hardware

Result: Finished.

Summer Week 4（8.27-9.2）

Aims for this week

Wet lab

①Finish the construction of odor DNA plasmids.

②Light experiment

③Flow cytometry

Modelling

①Color analysis

②Flow cytometry data analysis

Hardware

①Make more hardware to speed up illumination experiment efficiency

Human practice

①Interview

②Prepare for the video for 3 Minutes for Science

③Prepare for National Science Day

Monday 27th August

Wet lab

①Light experiment

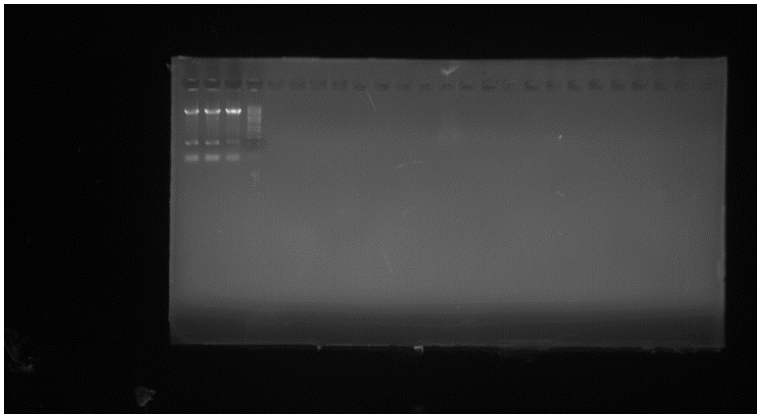
Aim: Test the response of florescent protein and chromoprotein.

Result: Further analysis.

②Amplification

Aim: Amplify and sequence 1235 cells

Result: Finished.



③Gibson Assembly

Aim: Using Gibson Assembly to construct chromoprotein plasmid.

Result: Further experiment.

④Construct parts

Modelling

Aim: Color analysis.

Result: Further analysis.

Hardware

Aim: Make more hardware to speed up illumination experiment efficiency
Result: Keep working.

Human Practice

Aim: Prepare for interview.
Result: Success.

Tuesday 28th August

Wet lab

①Light experiment

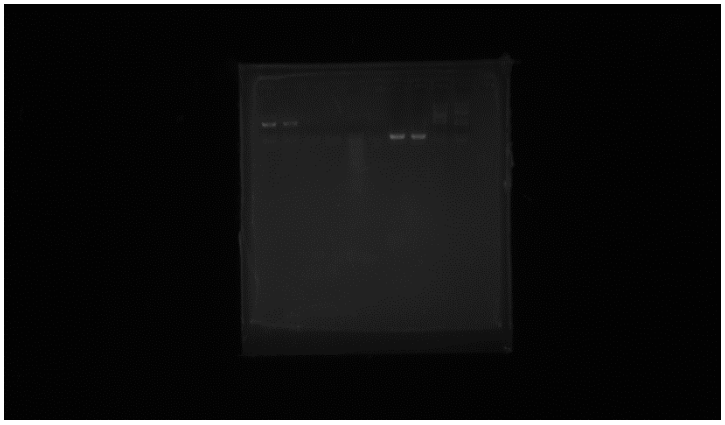
Aim: Test the response of florescent protein and chromoprotein.
Result: Further analysis.

②Extract plasmids

Aim: Extract plasmids of tandem chromoprotein
Result: Finished.

③Gibson Assembly

Aim: Using Gibson Assembly to construct chromoprotein plasmid.
Result: Further experiment.



④Construct parts

Modelling

Aim: Color analysis.
Result: Further analysis.

Hardware

Aim: Make more hardware to speed up illumination experiment efficiency
Result: Keep working.

Human Practice

Aim: Interview with Prof. YU from Beijing Institute of Genomics, Chinese Academy of Science.
Result: Success.

Wednesday 29th August

Wet lab

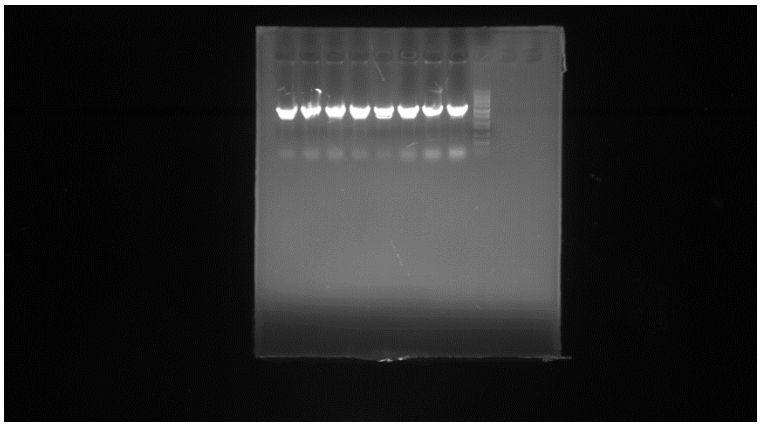
①Light experiment

Aim: Test the response of florescent protein and chromoprotein.
Result: Further analysis.

②Amplification of CRISPR

Aim: Amplify the result of CRISPR

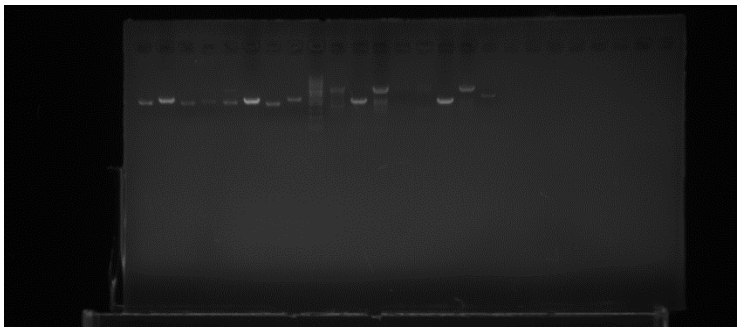
Result: Fail. Further experiment.



③Gibson Assembly

Aim: Using Gibson Assembly to construct chromoprotein plasmid.

Result: Further experiment.



④Construct parts

Modelling

Aim: Color analysis.

Result: Further analysis.

Hardware

Aim: Make more hardware to speed up illumination experiment efficiency

Result: Finished.

Human Practice

Aim: Record the interview with Prof. YU from Beijing Institute of Genomics, Chinese Academy of Science.

Result: Finished.

Thursday 30th August

Wet lab

①Light experiment

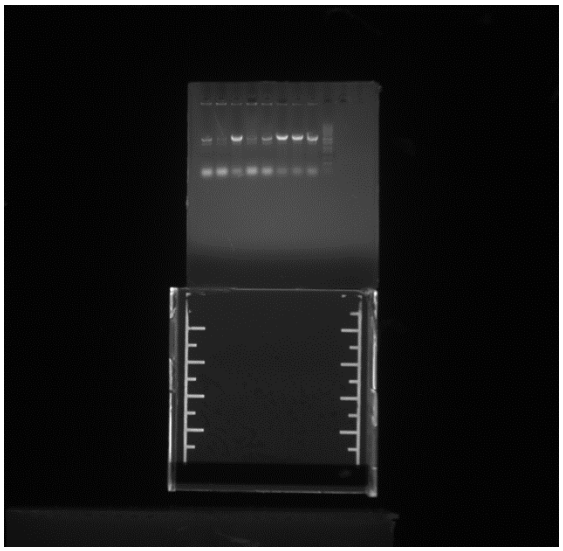
Aim: Test the response of florescent protein and chromoprotein.

Result: Further analysis.

②Amplification of CRISPR

Aim: Amplify the result of CRISPR

Result: Fail. Further experiment.



③Construct parts

④Flow cytometry

Aim: Flow cytometry for fluorescent protein

Result: Finished

Modelling

Aim: Color analysis.

Result: Finished.

Human Practice

Aim: Meet with artists from Art and Science Research Center in BIG

Result: Success.

Friday 31st August

Wet lab

①Light experiment

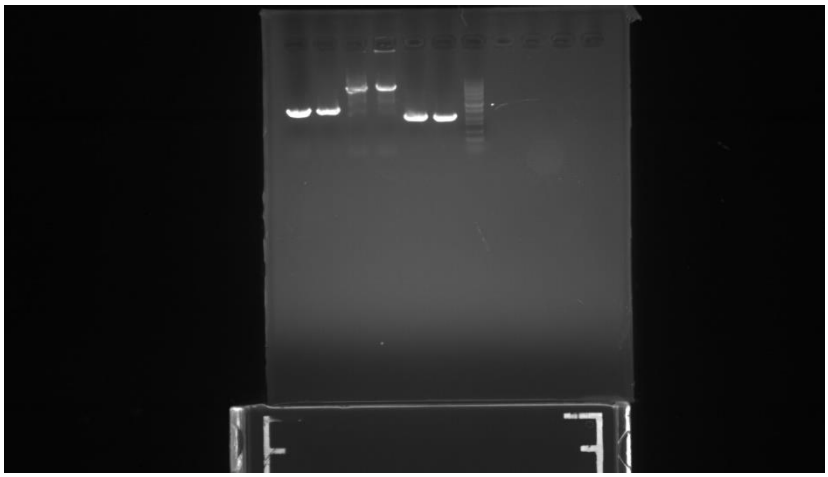
Aim: Test the response of florescent protein and chromoprotein.

Result: Further analysis.

②Construction of BSMT1 gene segment

Aim: Construct BSMT1 gene segment

Result: Further amplification.

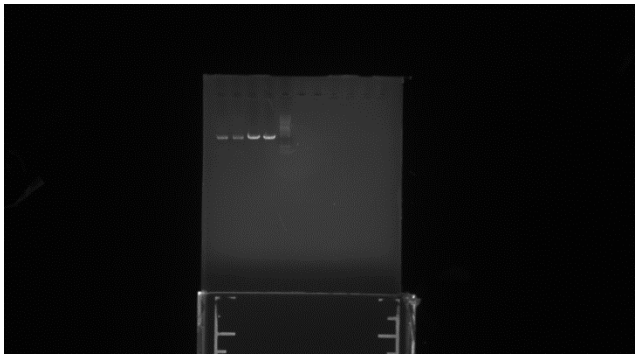


③Construct parts

④Gibson Assembly

Aim: Using Gibson Assembly to construct chromoprotein plasmid.

Result: Success



Modeling

Aim: Flow cytometry data analysis.

Result: Further analysis.

Saturday 1st September

Wet lab

①Light experiment

Aim: Test the response of florescent protein and chromoprotein.

Result: Further analysis.

②Construct parts

Modeling

Aim: Flow cytometry data analysis.

Result: Further analysis.

Sunday 2nd September

Wet lab

①Light experiment

Aim: Test the response of florescent protein and chromoprotein.

Result: Further analysis.

②Construct parts

Modeling

Aim: Flow cytometry data analysis.

Result: Finished.

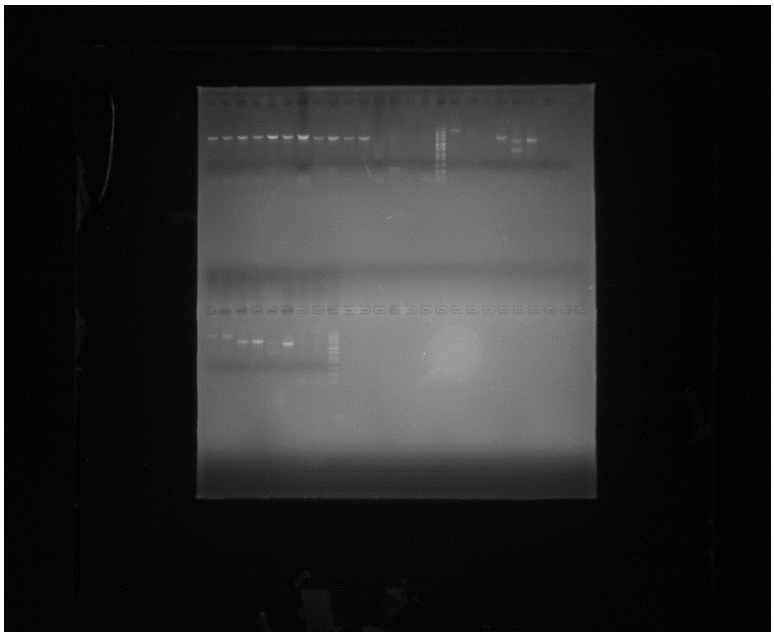
Summer Week 5（9.3-9.9）

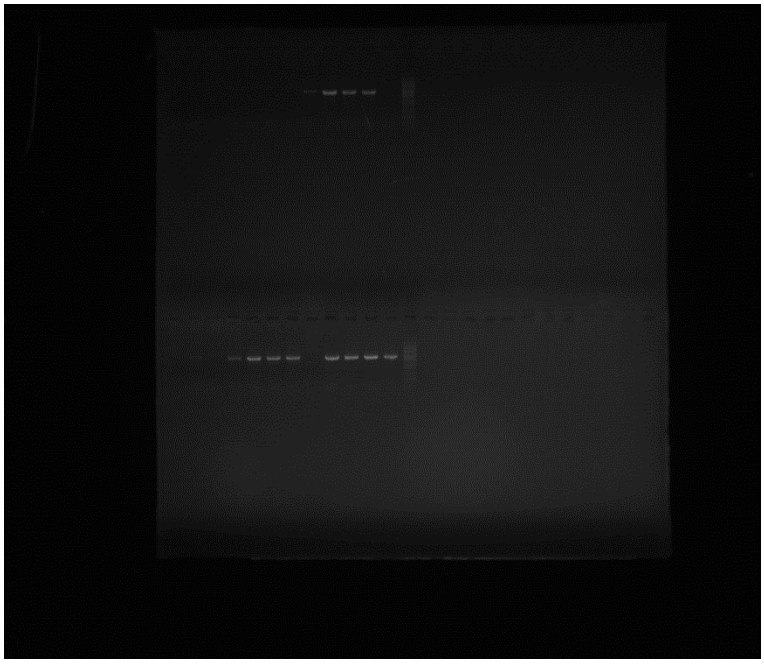
Wet lab

①Construct Parts

②Light experiment

③Construct odor plasmid





Modelling

①Light influence on E. coli growth

Hardware

①Use projector to perform illumination experiment.

②Design our final mode

Human practice

①Interview

②Visit Art and Science Research Center

③Domino

Summer Week 6（9.10-9.16）

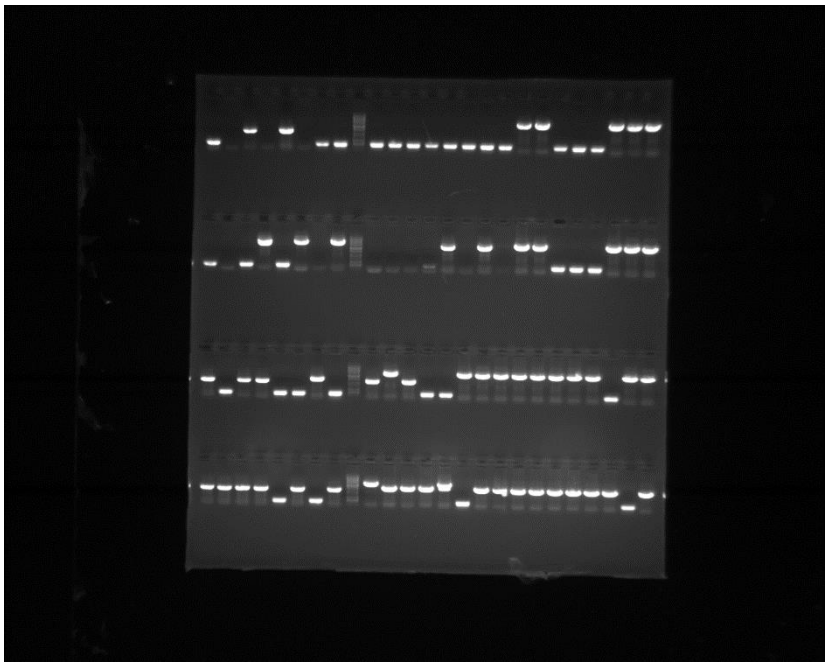
Wet lab

①Construct Parts

②Light experiment using projector

③Construct odor plasmid

④Flow Cytometry



Modelling

①Fluorescent-Time relationship

②Fluorescent-Light relationship

Hardware

①Decided the final design

②Oder for material of final model online.

Human practice

①Hold Beijing-Tianjin iGEM Alliance Establishing Conference & Meet-up

②Interview Lewis Sandler

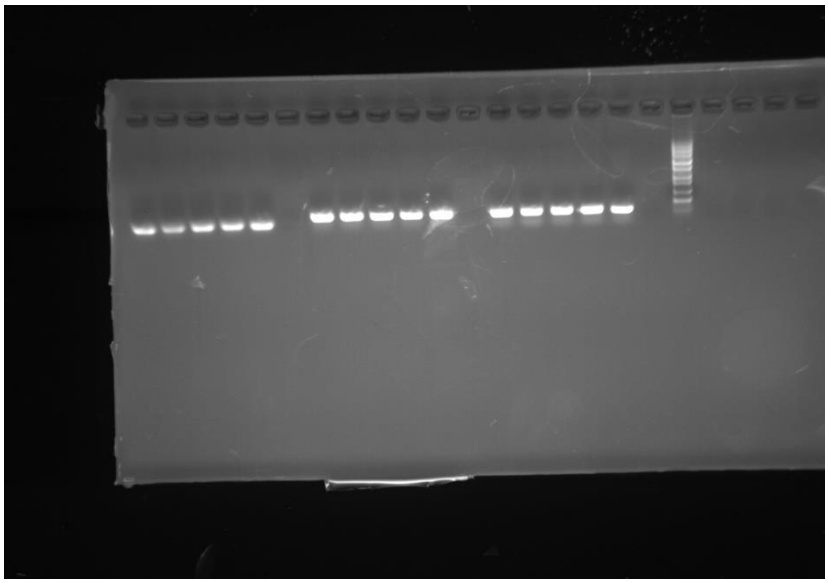
Summer Week 7（9.17-9.23）

Wet lab

①Construct Parts

②Light experiment using projector

③Amplification of odor system



Modelling

①Fluorescent-Time relationship

②Fluorescent-Light relationship

Hardware

①use projector to perform illumination experiment.

②Design our final mode

Human practice

①Interview

②Edit Domino Video

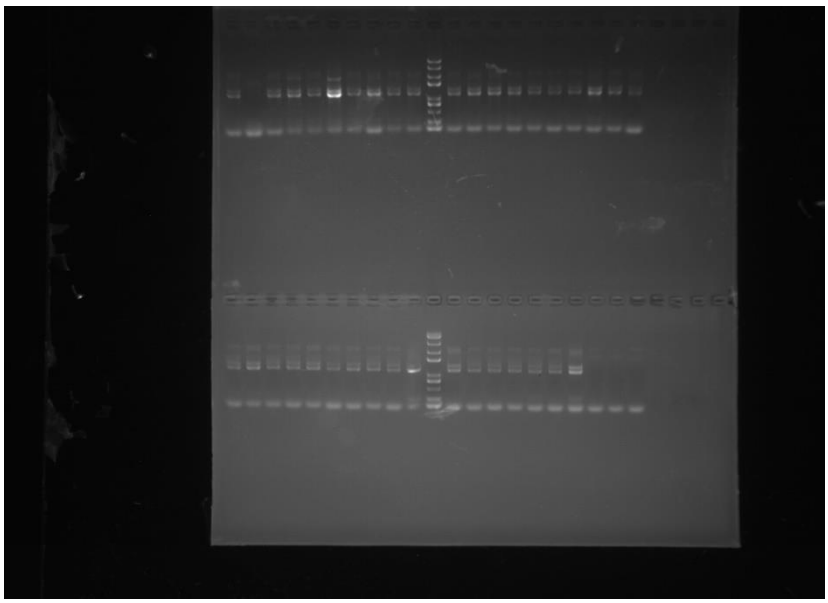
Summer Week 8（9.24-9.30）

Wet lab

①Construct Parts

②Light experiment using projector

③Amplification of odor system



Modelling

①Time and illuminance influence on fluorescent protein

Hardware

①use projector to perform illumination experiment.

②Design our final mode

Human practice

①Bilateral talk with BNU-China

②Offering equipment and experimental help to BNU-China

Summer Week 9（10.1-10.7）

Wet lab

①Construct Parts

②Light experiment using final hardware and connected to the software

③Flow Cytometry

Modelling

①Time and illuminance influence on fluorescent protein

②Model about hardware

Hardware

①Set up our final design and paint the surface

Human practice

①Offering equipment and experimental help to BNU-China

②Prepare for 3 Minutes for Science live competition

③Design *Daily iGEM*

Summer Week 10（10.8-10.14）

Wet lab

①Light experiment using final hardware and connected to the software

Modelling

①Time and illuminance influence on fluorescent protein

②Model about hardware

Human practice

①3 Minutes for Science live competition

②Podcast with Lewis Sandler

③Design *Daily iGEM*