iGEM 2013 Basic Safety Form

Team name: NRP-UEA-Norwich

Deadline: 30th of August 2013

Submission method: email form to the correct email list for your region:

safety_forms_asia@igem.org
safety_forms_europe@igem.org
safety_forms_north_america@igem.org
safety_forms_latin_america@igem.org

Students can complete this safety form, but it must be read and signed (electronic or hard copy) by your team's faculty advisor. Your advisor must verify the information contained in this form and sign it.

The iGEM Safety Committee must be able to easily reach the advisor with questions or other follow-up communication. If you have made changes to your project (new coding regions or organisms) you must resubmit your safety form before wiki freeze (date TBD).

Key points to remember as you complete the safety assessment process:

- For help in completing questions 1 and 2, you may find it useful to consult the Risk Groups section of the Safety Resources List [2013.igem.org/Safety].
- The iGEM Safety Committee will be reviewing your project. To avoid temporary suspensions, answer these questions completely and accurately.
- The Safety Committee needs to be able to communicate with your faculty advisor about any safety concerns. If we cannot reach your advisor in a reasonable amount of time, you may be subject to restrictions at the Jamboree.
- Your safety page, wiki project page and poster should be consistent with each other. If you change your project, submit an updated Basic Safety Page to the iGEM Safety Committee before the wiki freeze. (Your faculty advisor must also read and sign the updated page.)
- We understand that projects may still be changing at a late date. However, large discrepancies between what you submit on the Basic Safety Page and what you present at the Jamborees may result in restrictions at the Jamboree.

	Species	Strain no/name	Risk Group	Risk group source link	Disease risk to Humans? If so, which disease?
Ex	*E. coli* (K12)	NEB 10 Beta	1	www.absa.org/riskgroups/bacteriasearch.php?genus=&species=coli	Yes. May cause irritation to skin, eyes,and respiratory tract, may affect kidneys.
1	E. coli	Top10	1	http://oba.od.nih.gov/oba/rac/Guidelines/NIH_Guidelines.htm#_Toc351276382	
2	Uncharacterised actinomyces		1	http://oba.od.nih.gov/oba/rac/guidelines/nih_guidelines.htm#_Toc351276293	Transmission to laboratory personnel is a potential hazard although most environmental isolates of Actinobacteria are harmless and do not infect humans.
3	Streptomoyces S4	S4	1	http://oba.od.nih.gov/oba/rac/guidelines/nih_guidelines.htm#_Toc351276338	Transmission to laboratory personnel is a potential hazard although most environmental isolates of Actinobacteria are harmless and do not infect humans.

* For additional organisms, please include a spreadsheet in your submission.

2. Highest Risk Group Listed:

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If you answered 1+, please also complete the iGEM Biosafety from part 2 for any organisms in this category.

Additional information:
The RG2 species are uncharacterised soil isolates. Due to this we have put them under RG2 as we are unsure of what they are and as a result their potential for Harm. However any harm is mitigated by good lab practise, our safety precautions and the strains are typically non-pathogenic.

3. List and describe *all* new or modified coding regions you will be using in your project. (if you use parts from the 2013 iGEM Distribution without modifying them, you do not need to list those parts.)

	Part number.	Where did you get the physical DNA for this part (which lab, synthesis, etc)	What species does this part originally come from?	What is the Risk Group of the species ?	What is the function of this part, in its parent species?
Ex	BBa_C0040	Synthesized, Blue	Acinetobacter	2	Coners tetracycline

		Heron	baumannii		resistance
1	BBa_K1041000	iGEM distribution kit	*Discosoma striata*	1	Used to lure pray (sea anemone).
2	BBa_K1041001	Synthesised, Genscript	Streptomyces S4 and Streptomyces fradiae respectively 5'-3'	1	promoter controlling the transcription of antG gene activated by the sigma facter AntA. Provides resistance to neomycin/kanamycin.
3	BBa_K1041002	Part synthesised (genscript), part from iGEM distribution kit	Streptomyces S4 and Discosoma striata respectively 5'-3'	1	promoter controlling the transcription of antG gene activated by the sigma facter AntA.

4. Do the biological materials used in your lab work pose any of the following risks? Please describe.
a. Risks to the safety and health of team members or others working in the lab?

Transmission to laboratory personnel is a potential hazard although most environmental isolates of Actinobacteria are harmless and do not infect humans. There is no recorded precedence with the *E. coli* strains we use.

Good laboratory practise and implementation of the recommendations outlined in Schedule 8 will minimise risks. This will include restriction access to authorised workers, ensuring that all areas that have been in contact with potentially hazardous microorganism will be routinely swabbed with a recommended disinfectant, no laboratory clothing will be allowed outside the laboratory and all outdoor clothing will be stored in offices. All contaminated waste will be autoclaved using cycles detailed below.

b. Risks to the safety and health of the general public, if released by design or by accident?

The *E. coli* hosts used are unknown colonizing potential for both humans and animals, but are not known to be pathogenic. However, it is likely that the laboratory strains are less fit to survive in the environment compared with wild-type strains and as a result are less likely to cause infection and harm than naturally occurring clinical and environmental strains. It is unlikely that the organism will reach the environment or cause harm to humans or animals inside or outside the lab. In the case of intentional release we can for see no realistic implications.

c. Risks to the environment, if released by design or by accident?

The degree to which these *E. coli* strains might survive in the environment is unknown. However, it is likely that the laboratory strains are less fit to survive in the environment compared with wild-type strains and as a result are less likely to cause resulting problems.

d. Risks to security through malicious misuse by individuals, groups, or countries?

As stated in sections (4.a-c) there are no (known) serious implications for accidental release of the these strains as each is either less fit than wildtype or is an environmental isolate with no known pathogenicity. No foreseeable malicious use is reasonable for these strains that would result in a security threat.

5. If your project moved from a small-scale lab study to become widely used as a ommercial/industrial product, what new risks might arise? (Consider the different categories of risks that are listed in parts a-d of the previous question.) Also, what risks might arise if the knowledge you generate or the ethods you develop became widely available? (Note: This is meant to be a somewhat open-ended discussion question.)

Due to the major goal of the project being to identify new antibiotics I foresee few but the most imaginative and inefficient routes of "causing" risk e.g. malicious targeting. The reporter system could be utilised to identify eukaryotic drug targets (e.g. anti-fungal compounds) that would cause severe damage to humans and higher organisms – although this is unlikely to be a major concern as simpler, easier to obtain, quicker and likely more effective routes are currently available.

Additional risks due to the increased scale would be and increased volume/higher concentrations. We work with very small amounts of the compounds and as a result do not pose a massive risk. However industrial scales raise this risk.

6. Does your project include any design features to address safety risks? (For example: kill switches, auxotrophic chassis,etc.) Note that including such features is not mandatory to participate in iGEM, but many groups choose to include them.

No safety features are included as the aim and only viable use of the parts are as a reporter system. The only exception would be providing kanamycin resistance however testing to determine the repertoire of resistance catered for by the organism would allow specific targeting with antibiotics the organisms are sensitive with. Additionally release of these reporters/biobricks into the environment is not an aim or even a viable option due to the conjugative/integrative nature of the system required results in a non-transmissible tool.

7. What safety training have you received (or plan to receive in the future)? Provide a brief description, and a link to your institution's safety training requirements, if available.

Training in School safety procedures; training in good microbiological and general labortatory practise. Familiarity with risk assessments including but not limited to GM-, Microbiological risk assessments and those for specific techniques such as agarose gel electrophoresis.

Safety training to date has been generally associated with the institute rather than the specific experimentation (although some are listed above). As most processes do not require safety procedures beyond the normal level of precaution e.g. utilising PPE appropriately, sterile technique and general safe practise.

General safety training results in knowledge of the safety and emergency procedures and available equipment as well as emergency exit protocols. Additionally training into handling and disposal routes for various chemicals, micro-organisms, damaged apparatus (glass ware) has been approached through demonstration and risk assessment.

8. Under what biosafety provisions will / do you work?
a. Please provide a link to your institution biosafety guidelines.

https://intranet.uea.ac.uk/uss/intranet/Microbiological+Safety+Rules

b. Does your institution have an Institutional Biosafety Committee, or an equivalent group? If yes, have you discussed your project with them? Describe any concerns they raised with your project, and any changes you made to your project plan based on their review.

Yes but discussions with them were not carried out as the advisory panel was well aware of any risks with the work and any associated experimentation.

c. Does your country have national biosafety regulations or guidelines? If so, please provide a link to these regulations or guidelines if possible.

Yes

http://www.hse.gov.uk/biosafety/gmo/law.htm

http://www.hse.gov.uk/biosafety/gmo/acgm/acgmcomp/

d. According to the WHO Biosafety Manual, what is the BioSafety Level rating of your lab? (Check the summary table on page 3, and the fuller description that starts on page 9.) If your lab does not fit neatly into category 1, 2, 3, or 4, please describe its safety features [see 2013.igem.org/Safety for help].

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e. What is the Risk Group of your chassis organism(s), as you stated in question1? If it does not match the BSL rating of your laboratory, please explain what additional safety measures you are taking.

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Faculty Advisor Name:

Matt Hutchings

Faculty Advisor Signature:

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You must submit this form if you are working with any of the following:

- Organsism classified above Risk Group 1(RG1) (or, if your country rates organisms with 4 being the *least* dangerous, organisms more dangerous than Risk Group 4)
- Coding regions derived from organisms above RG1
- Mammalisn cells or organisms
- Genetic Parts Derived from Mammals

If you are only working with organisms/parts that are rated Risk Group 1 (the safest risk group), and have filled out the Basic Safety Form, you do not need to submit this form. You may use your own conutry's standards or WHO standards to determine which organisms/parts require this form. Please see *2013.igem.org/Safety* for more information on how to determine the Risk Group of your organism and Biological Safety Level of your lab.

The following are *exempt* and do not require you to submit this form:

- *Pseudomonas aeruginosa* and any genetic parts derived from it.
- Any parts included in the 2013 official iGEM distribution kit. (Note: many Registry parts are not in the distribution kit, and these parts still require a Beyond the Basics Form if they come from an organism above RG1, or from a mammal.)

Please complete this form and have your team faculty advisor sign it by the deadline. While students can complete this form, the faculty instructor needs to read your answers and sign it(electronically or hard copy). The Safety Committee will review your submissions and may request further information if your project raises safety concerns. Projects that raise the most serious concerns will be required to complete an extended biosafety form. (We expect that thiswill only happen only in a very small number of cases).

Please note:

- Although this form is required only for organisms/parts above RG1, that does not mean that RG1 organisms are totally safe. Good judgment and proper lab practices are necessary at all times.
- Consult with your faculty advisor, and with the biosafety committee at your institution.This form does not replace local institutional review. You must receive approval from your government or institution as may be required under local law.

This form must be completed separately for each organism or part above RG1. Please cite sources, including web lins as applicable, to support your statements.

1. Organism name and strain name or number

Uncharacterised actinomycetes soil isolates (of which there are ~200)

2. Organism Risk Group

   RG2

3. If you are using this organism as a chassis, write "chassis". If you are using a genetic part from the organism, give the name of the part and a brief description of what it does and why you are using it.

Chassis

4. How did you physically acquire the organism or part?

Soil samples were collected from around the country. These were plated on selective growth media containing two anti-fungal compounds, Nystatin and Cylcohexamide following serial dilution in water. Subsequent coloneys were chosen with similar morphology to filamentous actinomycetes.

5. What potential safet/health risks to team members, other people at your institution, or the general public could arise from your use of this organism/part?

For the specific organisms we seek there are no reported cases of human infection. However in processing uncharacterised soil samples we are aware of incubating potentially harmful soil-borne organisms which become more concentrated on the growth media than would be expected in the soil. We have selected for bacteria and inhibited fungal growth by using anti-fungal compounds in the media. All other bacteria that do not follow our criteria are subsequently disposed of safely as CAT 2 organisms by autoclaving.

6. What measures do you inted to take to ensure thatour project is safe for team members, other people at the institution, and the general public?

We currently work in a CAT2 capable lab. The standard level of safety and lab practise is sufficient to protect the general public, institute workers both in and out of the lab.

Good laboratory practise and implementation of the recommendations outlined in Schedule 8 will minimise risks. This will include restriction access to authorised workers, ensuring that

7. If you are using only a part from the organism, and you believe the part by itself is not dangerous, explain why you believe it is not dangerous.

8. Why do you need to use this organism/part? Is there an organism/part from a less dangerous Risk Group that would accomplish the same purpose?

Although it is unlikely, following characterisation, that the organism will still exist in the RG2 category, these organisms are essential. We plan on using the bio-senseor we have produced to screen the strains for the production of novel antimycins. As such these strains are essential as chassis without a great deal of sequencing genetic manipulation, cloning and characteristion.

9. Is the organism/part listed under the Australia group guidelines, or otherwise restricted for transport? If so, how will your team ship this part to iGEM and the Jamborees?

Any parts are RG1. Only our strain library is potential RG2. This will not be shipped. Any shipping problems are only those of transporting biological material.

10. Please describe the BioSafety Level of the lab in which the team works, or description of safety features of lab (Refer to Basic Safety form, question 8. D.). If you are using organisms with a BSL level greater than you lab, please explain any additional safety precautions you are taking.

level 2. We have no additional safety needs above standard working practice.

Faculty Advisor name:

Matt Hutchings

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