YENEPOYA

(DEEMED TO BE UNIVERSITY)
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Accredited by NAAC with 'A' Grade

Details of the Collaborative Activity

2020-21

Name of the Collaborating Institute: Jet Propulsion Laboratory, California Institute of Technology (Caltech), CA, USA

Name of the Collaborating Department from YDU: Yenepoya Research Center

Activities:

- **Joint Project:** Dr. Kasthuri Venkateshwaran and Dr. Nitin, California Institute of Technology and Dr. Rekha PD and Dr. Arun AB, Yenepoya Research Center initiated discussion regarding collaborative project on "Understanding the uropathogenesity of ISS microorganisms and other molecular mechanisms between ISS strains and *Kalamiella piersonii* YU22"
- Virtual meeting was conducted between both the parties to discuss on study of the lifestyle modifications and shared molecular mechanisms in microbes on 30th Sept. 2020.
- Invitation mail for collaboration from Dr. KasthuriVenkateshwaran was sent to Dr. Rekha PD regarding Microbiology research dated 01st Sept. 2020.
- Signing of Non-disclosure agreement was done between Caltech and YDU dated 06th Oct. 2020.

ATTESTED

Dr. Gangadhara Somayaji K S
Registrar
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University Road, Deralakatte
Mangalore 575 018, Karnataka.

YENEPOYA UNIVERSITY

Rekha PD <rekhapd@yenepoya.edu.in>

Re: [EXTERNAL] Kasthuri, you were recently cited by an author from Folkhälsan Research Center

Venkateswaran, Kasthuri J (US 352N) <kasthuri.j.venkateswaran@jpl.nasa.gov> Tue, Sep 1, 2020 at 8:21 PM
To: "rekhapd@yenepoya.edu.in" <rekhapd@yenepoya.edu.in>
Cc: "Singh, Nitin K (352N)" <nitin.k.singh@jpl.nasa.gov>

Hello Dr. Punchappady Devasya Rekha: Your article on *Kalamiella piersonii* YU22 is a great addition to our finding of this strain from ISS. The continued research on this strain named after our beloved late President APJ Kalam is a great tribute to him.

We are so excited to see that such a thorough uropathogenic study conducted on this novel species. It is really explains the importance of studying opportunistic pathogens that are isolated from confined system that are used for long space travel.

If you are interested we want to collaborate your team and work on the uropathogenicity of the type strain with YU22 and compare whether any differential pathogenetic characteristics present in ISS strains. We do have 10 strains of the *K. piersonii* and wish to see whether you and your team are interested.

Once you agree, NASA-JPL will generate Material Transfer Agreement and send you these strains for comparative study. Obviously we can jointly publish this study when we get some interesting results.

My colleague Dr. Nitin Singh is copied here for information who is the co-inventor to describe this novel species isolated from ISS. Thanks.

Dr. Kasthuri Venkateswaran (Venkat)

Senior Research Scientist

California Institute of Technology, Jet Propulsion Laboratory
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From: ResearchGate <no-reply@researchgatemail.net>
Date: Tuesday, September 1, 2020 at 12:26 AM
To: "Venkateswaran, Kasthuri J (US 352N)" <kasthuri.j.venkateswaran@jpl.nasa.gov>
Subject: [EXTERNAL] Kasthuri, you were recently cited by an author from Folkhälsan Research Center

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Rekha PD <rekhapd@yenepoya.edu.in>

Chemotaxonomy/BioLog characteristics of NOVEL species

Venkateswaran, Kasthuri J (US 352N) <kasthuri.j.venkateswaran@jpl.nasa.gov> Sun, Nov 22, 2020 at 9:04 PM
To: Rekha PD <rekhapd@yenepoya.edu.in>, "Dr. Sudeep Ghate" <sudeep1129@gmail.com>, "Dr. Arun A B" <bhagwatharun@hotmail.com>
Cc: "Singh, Nitin K (352N)" <nitin.k.singh@jpl.nasa.gov>

Hello Rekha/Arun:

During our meeting we talked about the possible chemotaxonomic characteristics of novel strains isolated from ISS as well as Mars 2020 mission associated environments. The attached Excel sheet showing the potential novel species (ISS and Mars assembly facility) and wish to see which one you and Arun are willing to help. If you are able to get the chemotaxonomy and BioLog profiles for all novel species that would be great. But if this is too much of work, I understand and see what you can do with your resources. Some of the strains are multiple strains of the same species. So, we can reduce to one per novel species and that will be around 14 to 15 strains. In total there are 27 strains consist of 14 to 15 novel species.

Obviously, we will jointly publish after the chemotaxonomy characterization since we have the whole genomes of these strains already. Thanks.

Dr. Kasthuri Venkateswaran (Venkat)

Senior Research Scientist

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From: "rekhapd@yenepoya.edu.in" <rekhapd@yenepoya.edu.in>
Date: Thursday, October 1, 2020 at 2:51 AM
To: "Venkateswaran, Kasthuri J (US 352N)" <kasthuri.j.venkateswaran@jpl.nasa.gov>, Nitin Singh <nitin.k.singh@jpl.nasa.gov>, "Dr. Sudeep Ghate" <sudeep1129@gmail.com>, "Dr. Arun A B" <bhagwatharun@hotmail.com>
Subject: [EXTERNAL] Collaborative Meeting proceedings

Dear all,

It was indeed a pleasure having the first meeting with you.

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Dr.Gangadhara Somayaji K.S.
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Mangalore- 575 018, Karnataka

Some of the important points discussed in the meeting are attached for next steps.

Kind Regards

Rekha P.D.

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Dr. Rekha P.D.

Professor and Deputy Director

Yenepoya Research Centre

Yenepoya Deemed to be University

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Novel species for Chemo-Rekha and Arun.xlsx
11K

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Rekha PD <rekhapd@yenepoya.edu.in>

Collaborative Meeting proceedings

Rekha PD <rekhapd@yenepoya.edu.in> Thu, Oct 1, 2020 at 3:15 PM
To: "Venkateswaran, Kasthuri J (US 352N)" <kasthuri.j.venkateswaran@jpl.nasa.gov>, "Singh, Nitin K (352N)" <nitin.k.singh@jpl.nasa.gov>, "Dr. Sudeep Ghate" <sudeep1129@gmail.com>, "Dr. Arun A B" <bhagwatharun@hotmail.com>

Dear all,

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Some of the important points discussed in the meeting are attached for next steps.

Kind Regards

Rekha P.D.

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Dr. Rekha P.D.
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Yenepoya Research Centre
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Virtual meeting 30th Sep 2020.docx
2636K

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Jet Propulsion Laboratory
California Institute of Technology

YENEPOYA RESEARCH CENTRE

YENEPOYA
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Meeting Resolutions

This is to summarise the meeting held on 30.09.2020 from 19.30 – 20.30 IST, regarding the collaborative work between Jet Propulsion Laboratory, California Institute of Technology ("Caltech") and Yenepoya Research Centre (YRC), Yenepoya (Deemed to be university) on studying the lifestyle modifications and shared molecular mechanisms between *Kalamiella piersonii* YU22 and International Space Station (ISS) strains of *K. piersonii.*

The meeting was represented by:

1. Dr. Kasthuri Venkateswaran (JPL)
2. Dr. Nitin Kumar Singh (JPL)
3. Dr. Rekha P D (YRC)
4. Dr. Arun Bhagwath (YRC)
5. Dr. Sudeep Ghate (YRC)

- Discussed on the research interests of the groups briefly.
- Dr. Venkat presented the work plan on behalf of JFL. Dr. Rekha briefly explained on the YRC work plans.
- Major decisions:
    - Sharing the international isolates for testing the pathogenicity in model systems developed in YRC.
    - Dr. Venkat and team will carry out the Nanopore sequencing of YU22 to get whole genome and plasmid sequences and a Pan-genome analysis will be carried out with other ISS isolates at JPL.
    - Detailed studies on the comparison of virulence factors between YU22 and ISS *K. piersonii* strains (Dr. Rekha and team will be carrying out in vitro assays) cell line assays, antibiotic susceptibility assays and animal experiments to determine the variation in the pathogenicity between the isolates. This may help to understand the evolution/loss of virulence factors under stress conditions in Space.
- Dr. Rekha and team will also carry out studies to test the growth in urine, struvite crystallisation and urea utilisation studies for both ISS and YU22 *K. piersonii* isolates to understand the alternate urea metabolism pathway.
- Dr. Venkat will facilitate the collaboration and funding through ISRO for similar studies.
- Dr. Rekha has invited Dr. Venkat and Dr. Singh to deliver webinars on Space biology/Space contamination due to Terrestrial microbes as a part of Science Unlimited webinar series hosted by Yenepoya (Deemed to be university).
- Dr. Venkat will explore Urine microbiome of astronauts in a case-control study with healthy group.

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