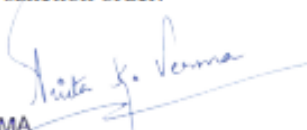



**Scientific and Technical Progress Report (STPR) [\*]  
(DBT R&D projects)**

**Section-A : Project Details**

- A1. File No. & Project Title:** BT/PR21645/NNT/1224/2017 “Small molecule functionalized biopolymeric nanoparticles encapsulating siRNA for targeted delivery to osteoblasts for managing bone disorders”
- A2. DBT Sanction Order No. & Date:** 102/IFD/SAN/1159/2017-2018 & June 16, 2017
- A3. Date of Project Initiation (If this date is different than date mentioned in A2, please clarify the reason):** 19<sup>th</sup> July, 2017
- A4. Date of project completion:** 19<sup>th</sup> July, 2020  
**Extension:** 31<sup>st</sup> Dec 2020
- A5. Name of Project Coordinator/ Principal Investigator/Co-PI/Co-Investigator:**
- | PI                    | Co-PI                  |
|-----------------------|------------------------|
| Dr. Anita Kamra Verma | Dr. Sushma Talegaonkar |
| Associate Professor   | Associate Professor    |
- A6. Institute(s):**
- | PI                    | Co-PI                              |
|-----------------------|------------------------------------|
| Nano-biotech Lab      | Dept. of Pharmaceutics             |
| Department of Zoology | Delhi Pharma Sciences and Research |
| Kirori Mal College    | University (DPSRU)                 |
- A7. Address with Contact Nos. (Landline & Mobile) & Email of Project Co-coordinator/ PIs and Co-PIs/ Co-Is:**
- | PI  | Co-PI   |
|---|---|
| Address: University of Delhi<br>Delhi-110007                          | Address: Pushp Vihar, Sector 3,<br>New Delhi-17         |
| Contact no.: +919818921222  | Contact no. : +919818453518                             |
| Email: <a href="mailto:akverma@kmc.du.ac.in">akverma@kmc.du.ac.in</a> | Email: <a href="mailto:stalegoankar@">stalegoankar@</a> |
- A8. Total Approved Cost (including additional cost, if any):** Rs 6756200/-
- A9. Approved Duration:** The duration of the project is 3 years from the date of this sanction order.

  
**Dr. ANITA KAMRA VERMA**  
Principal Investigator  
**PRINCIPAL INVESTIGATOR**  
(Signed and stamped)

No. - BT/PR 21645/NNT/1224/2017  
DEPARTMENT OF BIOTECHNOLOGY  
GOVERNMENT OF INDIA  
DEPARTMENT OF ZOOLOGY  
KIRORI MAL COLLEGE, DELHI-110007  
E-mail: [akverma@kmc.du.ac.in](mailto:akverma@kmc.du.ac.in), [akverma23@hotmail.com](mailto:akverma23@hotmail.com)

  
**Prof. Vibha Singh Chauhan**  
**HEAD OF THE INSTITUTE**  
(Signed and stamped)

प्रो० विभा सिंह चौहान (Prof. Vibha Singh Chauhan)  
प्रधानाचार्य / Principal  
किरौरी मल कॉलेज / Kirori Mal College  
(दिल्ली विश्वविद्यालय) / (University of Delhi)  
दिल्ली-110007 / Delhi-110007

## Measurable Indicators

Title of the Project: “Small molecule functionalized biopolymeric nanoparticles encapsulating SiRNA for targeted delivery to osteoblasts for managing bone disorders”

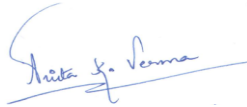
Project No : (BT/PR 21645/NNT/28/1224/2017)

Name of the PI : Dr Anita Kamra Verma

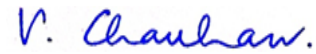
Name of the Institute: Kirori Mal College, University of Delhi

Details on indicators to measure outcome					
S.NO.	Indicator Name	Year 1	Year 2	Year 3	Future potential
1.	Publications		01	02	We will have 3 PhDs and 8 publications Under this project
	Present Status			04 (Comm)	
2.	Patents			In progress	Most likely a Patent too once the formulation is validated in animal studies.
	Present Status				
3.	Technologies generated			Nil	
	Present Status				
4.	Technologies Commercialized			Nil	
	Present Status				
5.	No. of Technology demonstration Activities		01 work shop	02 work shop	<b>Training Manpower: Faculty and Students</b> 1. Trained them on Advanced spectroscopy, & DLS 2. Motivating students to understand Use of Animal in Research & Education 3. Training students on Basics of Animal Cell Culture
6.	Population benefitted (If societal relevance)			NA	
7.	Other Leads/Activities (If Any)				This will have tremendous potential for treating bone deficiency disorders including osteoporosis, rheumatoid arthritis, osteoarthritis, osteoblast dysfunction induced metabolic disorders

Note: Annexure is required for detailed information on title/journal/impact factor/patents no/Application No./Commercialization status/others



Name & Signature of Project Investigator



Signature, Head of the Institution

Dr. ANITA KAMRA VERMA  
Principal Investigator  
No. - BT/PR 21645/NNT/28/1224/2017  
DEPARTMENT OF BIOTECHNOLOGY  
GOVERNMENT OF INDIA  
DEPARTMENT OF ZOOLOGY  
KIRORI MAL COLLEGE, DELHI-110007  
E-mail: akverma@kmc.du.ac.in / akverma23@hotmail.com

प्रो. विभा सिंह चौहान  
(Prof. Vibha Singh Chauhan)  
प्राचार्या / Principal  
किरोरी मल कॉलेज / Kirori Mal College  
(दिल्ली विश्वविद्यालय) / (University of Delhi)  
दिल्ली-110007 / Delhi-110007

## List of Annexures:

### Publications

1. Role of folate-conjugated glycol-chitosan nanoparticles in modulating the activated macrophages to ameliorate inflammatory arthritis: *in vitro* and *in vivo* activities” 2020; **Kumar, Vijay**; Leekha, Ankita; Kaul, Ankur; Mishra, Anil; **Verma, Anita Kamra**  
**Drug Delivery and Translational Research**, doi.org/10.1007/s13346-020-00765-w.  
**Impact Factor: 3.041**; Springer (An Official Journal of the Controlled Release Society)
2. **Book Chapters:** Rheumatoid arthritis: basic pathophysiology and role of chitosan nanoparticles in therapy (2020); **Vijay Kumar**, Jagat R Kanwar, **Anita Kamra Verma**; in **Advances and Avenues in the Development of Novel Carriers for Bioactives and Biological Agents (Elsevier)**
3. **PhD: 03 students**
  - i) **Vijay Kumar** is thankful to this project for enabling his Ph.D degree- *“Design and Development of pH responsive chitosan and Glycol chitosan nanoparticles to ameliorate experimental inflammatory arthritis in Rat model”*
  - ii) Largee Biswas is completing 3<sup>rd</sup> year of PhD;
  - iii) Vikas Shukla is completing 2<sup>nd</sup> year of PhD;
4. Poster for Workshop on **“Advanced Spectroscopy & Dynamic Light Scattering”**
5. Poster for Workshop on **“Use of Animals for Research and Education: a necessity?”**
6. Poster for Workshop on **“Basic Techniques in Animal Cell Culture”**
7. **Poster on “Antimicrobial and biocompatibility potential of gold-chitosan nanocomposites” in the 1<sup>st</sup> International conference on Integrative Chemistry, Biology and Translational medicine, 25-26 Feb, 2019, Conference hall, University of Delhi-110007**
8. Oral Presentaion **“Harnessing inflammatory arthritis by pH-responsive glycolchitosan nanoparticles: in vitro and in vivo activities”** Dr. Anita K.Verma in Global Bio-India Submit-2019, Nanobioteck-2019 and Nanoforagri-2019 with association of Department of Biotechnology, Govt. of India at Aerocity, New Delhi (21<sup>st</sup>-23<sup>rd</sup> November 2019). (Schedule attached)
9. **Poster on “Novel one-pot but two-step synthesis of modified biofunctionalized gold nanoparticles as siRNA carrier”** in Global Bio-India Submit-2019, Nanobioteck-2019 and Nanoforagri-2019 with association of Department of Biotechnology, Govt. of India at Aerocity, New Delhi (21<sup>th</sup>-23<sup>rd</sup> November 2019).
10. **iii) Largee Biswas presented poster on “Therapeutic potential of oral resveratrol chitosan drug delivery system in VCD induced osteoporotic mice model by activation of SIRT1”** in Virtually Symposium “Second International Symposium “Functional Nanomaterials in Industrial and clinical application: Academy-Industry-Clinical Meet” under UKIERI on 14<sup>th</sup>- 16<sup>th</sup> July 2020. (Link: <https://secondnanosymposiumatuclan.net/programme/>)
11. **Poster on “Lysophosphatidic acid (LPA) as a potential biomarker to envisage cardiovascular disease (CVD) in Rheumatoid arthritis patients”** in Virtually Symposium “Second International Symposium “Functional Nanomaterials in Industrial and clinical application: Academy-Industry-Clinical Meet” under UKERI on 14<sup>th</sup>-16<sup>th</sup> July 2020. (Link: <https://secondnanosymposiumatuclan.net/programme/>)