List of 10 best papers highlighted with important discoveries/contributions.

1. **Sushant Singh**, A Ly, S Das, T. S. Sakthivel, S Barkam, S Seal. Cerium Oxide Nanoparticle at the Nano-Bio Interface - Size Dependent Cellular Uptake. **Artificial Cells, Nanomedicine and Biotechnology**. 2018; 46; 956-963. **(IF 4.46)**

   Link to Paper - https://www.tandfonline.com/doi/full/10.1080/21691401.2018.1521818

Discoveries made – In this manuscript, we discovered that cerium oxide nanomaterials in the ultrasmall size range does not utilize the energy dependent pathways instead its transfer in and out of the cells are energy independent and can be effectively used for delivery of biomolecules and drugs as per requirement. This energy independent transfer does not end up in lysosomes and can be used as smart delivery techniques for the drug therapy and related therapeutic modules.

My contribution here is the concept development, synthesis and characterization of antioxidative cerium oxide nanomaterials.

2. LM Estes*, P Singha*, **Sushant Singh***, TS Sakthivel, E Brisbois, S Seal, H Handa. Characterization of a Nitric Oxide (NO) Donor Molecule and Cerium Oxide Nanoparticle (CNP) Interactions and Their Synergistic Antimicrobial Potential for Biomedical Applications. **Journal of Colloid and Interface Science. (2020)** ***(*Equal Contribution)*** **(IF-7.49)**

   Link to paper - https://doi.org/10.1016/j.jcis.2020.10.081

Discovery made – In this published manuscript, we discovered that cerium oxide nanomaterials in association with SNAP molecules acts as an excellent antimicrobial for the inhibition of bacteria and fungi species tested. Cerium oxide nanomaterials utilized its antioxidative ROS scavenging property in addition to SNAP nitrous oxide scavenging property. These materials together can be applied further as a SMART coating material in different biomedical instrument for antimicrobial resistance. The major application can be found into the catheter and related tubes used for medical purposes. These materials have an immense biomedical application in near future.

My contribution here is the concept development, synthesis and characterization of antioxidative cerium oxide nanomaterials.

3. C Zgheib, SA Hilton, LC Dewberry, MM Hodges, S Ghatak, J Xu, **Sushant Singh**, S Roy, CK Sen, S Seal, KW Liechty. Use of Cerium Oxide Nanoparticles Conjugated with MicroRNA-146a to Correct the Diabetic Wound Healing Impairment. Journal of the American College of Surgeons. 2018; October-22. **(IF - 4.45).**

   Link to Paper - https://www.journalacs.org/article/S1072-7515(18)32072-6/fulltext

Contribution made – Herein, we used antioxidative cerium oxide nanomaterials for delivering the miRNA for the diabetic wound healing application. Antioxidative cerium oxide nanomaterial is conjugated with miRNA using EDAC-NHS chemistry and successfully transfers the miRNA to site of wound action where it helps in the recovery of wound in diabetic condition. This combination together increases the diabetic wound healing capacity and significantly reduces the time duration of healing from 17 to 14 days. Antioxidative CNP scavenges the different ROS molecules and let the miRNA to work on the decrease of inflammatory roles of other molecules.

My contribution was in the synthesis and characterization of highly stable CNP-miRNA molecules.

4. G Sener, SA Hilton, MJ Osmond, C Zgheib, JP Newsom, L Dewberry, **Sushant Singh**, TS Sakthival, S Seal, KW Liechty, MD Krebs. Injectable, Self-Healable Zwitterionic Cryogels with Sustained MicroRNA-Cerium Oxide Nanoparticle Release Promote Accelerated Wound Healing. **Acta Biomaterialia.** 101, 262-272, 2020. **(IF - 6.3)**

   Link to the paper - https://www.sciencedirect.com/science/article/pii/S1742706119307548

Contribution made – Herein, a self healable zwitterionic cryogel was synthesized and antioxidative CNP was incorporated into the gel. This cryogel possess significant advancement above the available hydrogel in terms of storing the component with it and in terms of delivering over a long range of time. The cryogel are self-healable and does not break down and provides high amount of moisture with prolonged release time to the contained drug which is here the antioxidative CNP. With antioxidative and self-

healing properties these finds major application in antioxidative healing of the wounds and into the dressing material for biomedical applications.

My contribution was in the synthesis and characterization of highly stable antioxidative CNP.

5. LC Dewberry, SM Niemiec, SA Hilton, AE Louiselle, **Sushant Singh**, TS Sakthivel, J Hu, SSeal, KW Liechty, CZgheib. Cerium oxide nanoparticle conjugation to microRNA-146a mechanism of correction for impaired diabetic wound healing. **Nanomedicine: Nanotechnology, Biology and Medicine (IF 6.45). (Accepted for Publication)**

   Contributions made – This is recently accepted publication, and in continuation to CNP-miRNA diabetic wound healing application. The drug synthesized here i.e CNP-miRNA 146a is currently under clinical trial for efficiently reducing the time duration of healing process. Antioxidative CNP plays significant role in decreasing the oxidative stress in controlling the inflammatory environment for efficient wound healing.

   My contribution was in the synthesis and characterization of highly stable CNP-miRNA molecules.

6. SM. Niemiec, SA. Hilton, A Walbank, M Bannerman,AE. Louiselle, H Elajaili, A Allawzi, J Xu, C Mattson, LC. Dewberry, J Hu, **Sushant Singh**, TS Sakthivel, E Grayck, B Smith, S Seal, C Zgheib, KW. Liechty. Cerium oxide nanoparticles conjugated to anti-inflammatory microRNA-146a prevent bleomycin-induced acute lung injury. **Nanomedicine: Nanotechnology, Biology and Medicine (IF 6.45)**

   Link to Paper - https://www.sciencedirect.com/science/article/pii/S1549963421000319

   Contributions made – Herein, CNP-miRNA146a role in preventing bleomycin induces lung injury was observed and CNP-miRNA decrease the toxic effects into the lung injury. This paper indicates the role CNP-miRNA146a into the healing aspect beyond diabetic conditions and indicated its efficacy. This is highly important as these drugs are under clinical trial for diabetic wound healing and significantly may be beneficial to other associated diseases.

   My contribution was in the synthesis and characterization of highly stable CNP-miRNA molecules.

7. FM Ribeiro, M Maciel de Oliveira, **Sushant Singh**, T Sakthivel, C Neal, S Seal, T Nakamura, S Lautenschlager, C Nakamura. CNP decrease UVA-induced fibroblast death through cell redox regulation leading to cell survival, migration and proliferation. **Frontiers in Bioengineering and Biotechnology,** ***8 (577557), 2020)***. **(IF-4.2)**

   Link to Paper - https://www.frontiersin.org/articles/10.3389/fbioe.2020.577557/full

   Contributions made – Further, application of antioxidative cerium oxide nanoparticle were observed into the protection of UV in fibroblast leading to its application in cosmetics. Herein, we observed that antioxidative CNP decreases the negative effects of UV rays into the fibroblast cells and inhibits the cell death effects through its antioxidative behavior.

   My contribution were in the synthesis and characterization of highly stable antioxidative CNP.

8. **Sushant Singh**, U Kumar, D Gittess, T Sakthivel, B Babu, S Seal. Cerium Oxide Nanomaterial with Dual Antioxidative Scavenging Potential: Synthesis and Characterization. **Journals of Biomaterials Applications. (IF 2.7). (Accepted)** ***(Corresponding Author)***

   Link to Paper https://doi.org/10.1177/08853282211013451

   Discovery made – Herein, Cerium oxide nanomaterials with dual antioxidative potentials were synthesized and characterized using novel process. These CNP possess superoxide dismutase and catalase mimetic properties. Antioxidative mimetic behavior of CNP for both these enzymes are unique in this category and finds significant potential for future biomedical applications.

   My contribution was in the concept development and synthesis and characterization of highly stable antioxidative CNP.

9. A Gupta, TS Sakthival, CJ Neal, S Koul, **Sushant Singh**, A Kushima, S Seal. Antioxidant Properties of Nanoceria Films with Tunable Valency. **Biomaterials Science.** 7, 3051-3061,2019**(IF-5.8).**

   Link to Paper - https://pubs.rsc.org/en/content/articlelanding/2019/bm/c9bm00397e!divAbstract

   Contributions made – Herein, antioxidative CNP were coated onto the silica materials using Atomic layer deposition technique. These finds major application in antioxidative coatings developments for biomedical applications including medical instruments and related stuff.

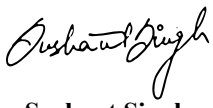
   My contribution was in the concept development and synthesis and characterization of highly stable antioxidative CNP.

10. N Saraf, S Barkam, M Peppler, A Metke, AV Guardado, **Sushant Singh**, C Emile, A Bico, C Rodas, SSeal. Microsensor for limonin detection: an indicator of citrus greening disease. **Sensors and Actuators B: Chemical**. 283,724-730. 2019. **(IF - 6.3).**

    Link to Paper - https://www.sciencedirect.com/science/article/abs/pii/S0925400518321865

    Contributions made – Herein, we developed a CNP based sensor for the detection of Limonin from orange juice. This invention holds promise in the fruit juice detection industry where quality of the juice is highly important for the industry to proceed.

    My Contribution were in the development of Silk based CNP for the interaction with limonin for quality assessment.



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