PONDICHERRY UNIVERSITY

PONDICHERRY

EXECUTIVE SUMMARY OF FINAL REPORT OF THE WORK DONE ON THE PROJECT

01. TITLE OF THE PROJECT	Electronically and structurally tuned synthesis and biological studies of metal based CO releasing molecules (CORMS)
02. NAME AND ADDRESS OF THE PRINCIPAL INVESTIGATOR	Dr. C. Sivasankar, Professor, Dept. of. Chemistry, Pondicherry University, Pondicherry-605014.
03. NAME AND ADDRESS OF THE INSTITUTION	Dept. of. Chemistry, Pondicherry University, RV. Nagar-Kalapet, Pondicherry-605014.
04. UGC APPROVAL LETTER NO. AND DATE	F. No. 43-177/2014(SR) dated 17/08/2015
05. DATE OF IMPLEMENTATION	01-07-2015
06. TENURE OF THE PROJECT	3 years or up to 30-06-2018
07. TOTAL GRANT ALLOCATED	Rs. 11,79,600/-
08. TOTAL GRANT RECEIVED	Rs. 9,73,868/-
09. FINAL EXPENDITURE	Rs. 9,48,667/-
10. TITLE OF THE PROJECT	Electronically and structurally tuned synthesis and biological studies of metal based CO releasing molecules (CORMS)
11. OBJECTIVES OF THE PROJECT	▪ Study the electronic features of metal carbonyls with our choice of ancillary ligands using computational methods. ▪ Understand the CO releasing ability of computationally screened metal carbonyls by probing all possible mechanisms. ▪ Synthesis and characterize all the possible metal carbonyls that are checked computationally. ▪ Tune the CO releasing ability of metal carbonyls using suitable proteins experimentally. ▪ Study the cytotoxicity of the synthesized CO releasing molecules under various conditions.
12. WHETHER OBJECTIVES WERE ACHIEVED	Yes. We have synthesized some novel CORMs and characterized and examined their CO releasing ability using the Myoglobin Assay. The cytotoxicity of the synthesized CORMs were also studied.
13. ACHIEVEMENTS FROM THE PROJECT	We were able to synthesize few novel manganese carbonyl complexes which released CO when subjected to light of different wavelengths. We could determine that with the use of various ligands the nature of

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	light affecting the CO release could be altered. We could also synthesize complexes which showed good cytotoxicity towards malignant lung cancer cells.
14. SUMMARY OF THE FINDINGS (IN 500 WORDS)	We have synthesized some novel manganese carbonyl complexes which were found to release CO under different conditions. They were characterized using various analytical techniques and their CO releasing ability was examined using the standard Myoglobin Assay. From the assay we could conclude that the manganese carbonyl complexes having chelating ligands with (P,P) donor atoms release CO when subjected to UV radiation, whereas those having (N,N) donor atoms released CO under visible light. Hence, we were able to control the nature of light which leads to the cleavage of the carbonyl ligands as well as the rate of CO release. The cytotoxicity of the synthesized CORMs was also studied. The cytotoxicity study revealed that the synthesized complexes showed promising cytotoxicity towards malignant lung cancer cells.
15. CONTRIBUTION TO THE SOCIETY (GIVE DETAILS)	We were able to synthesize few novel manganese carbonyl complexes which released CO using light in the phototherapeutic window. We could also synthesize complexes which showed good cytotoxicity towards malignant lung cancer cells.
16. WHETHER ANY PH.D. ENROLLED/PRODUCED OUT OF THE PROJECT	Yes. P. Kuzhalmozhimadarasi; date of registration: 07-04-2016
17. NO. OF PUBLICATIONS OUT OF THE PROJECT (PLEASE ATTACH)	1. Ramakrishna, K.;Sivasankar, C. *Org. Biomol. Chem.*, 2017, **15**, 2392-2396. 2. Ramakrishna, K.;Sivasankar, *Eur. J. Org. Chem.*, 2017, **27**, 4035-4043. 3. Thomas, J., M.; S. Baskaran, R. Rajalakshmi, P. Venuvanalingam and Chinnappan Sivasankar: Mechanistic Investigation of CO Release from [M(CO)5X]- (M = Cr, Mo, W; X = F-, Cl-, Br-, I-): DFT studies, 2018. (Manuscript under preparation). 4. CO releasing and cytotoxicity studies of some newly synthesized terpyridine stabilized manganese carbonyl complexes. (Manuscript under preparation). 5. CO releasing and cytotoxicity studies of some newly synthesized phosphine stabilized manganese carbonyl complexes. (Manuscript under preparation).
(PRINCIPAL INVESTIGATOR)	(REGISTRAR) (Seal)

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