

3D Supramolecular Zn(II) Coordination Polymer: Luminescent Property and Preventive Effect on Implant Repair Recurrent Infection after Oral Anesthetics

Peng LIN¹, Yi-Dun XIE², Yan HAO³ & Hui-Ping HE^{2*}

¹ Department of Anesthesiology, Women and Children's Hospital,
School of Medicine, Xiamen University, Xiamen, Fujian, China

² Department of Stomatology, The Ninth Hospital of Xi'an,
Xi'an, Shaanxi, China

³ Department of Stomatology, Women and Children's Hospital, School of Medicine,
Xiamen University, Xiamen, Fujian, China

SUMMARY. Here, a novel Zn(II) coordination polymer (CP) with two dimensional framework was reported, that is $[\text{Zn}(\text{L})(4,4'\text{-bipy})_2(\text{H}_2\text{O})_2]_n \cdot 4n(\text{H}_2\text{O})$ (**1**, Na_2L is 2,2'-(1,1'-biphenyl)-4,4'-diyl-di-2,1-ethenediyl)bis-benzenesulfonic acid disodium salt and 4,4'-bipy is 4,4'-bipyridine), and it is synthesized through the hydrothermal reactions between 4,4'-bipy, Na_2L , together with $\text{Zn}(\text{NO}_3)_2 \cdot 6\text{H}_2\text{O}$, which is further characterized through the single crystal X-ray diffraction (SCXRD) analysis. Besides, the CP **1**'s crystalline sample displays intense luminescence at room temperature. Its treatment on implant repair recurrent infection after oral anesthetics was evaluated and the related mechanism was explored at the same times. Firstly, the levels of inflammatory cytokines released into the gingival fluid were measured with enzyme linked immunosorbent assay (ELISA) detection kit. In addition to this, the activation of the nuclear factor kappa-B (NF- κ B) in gum tissue was measured with real time reverse transcription-polymerase chain reaction (RT-PCR) assay.

RESUMEN. Aquí se informa sobre un nuevo polímero de coordinación (CP) de Zn(II) con estructura bidimensional, es decir $[\text{Zn}(\text{L})(4,4'\text{-bipy})_2(\text{H}_2\text{O})_2]_n \cdot 4n(\text{H}_2\text{O})$ (**1**, Na_2L es sal disódica del ácido 2,2'-(1,1'-bifenil)-4,4'-diildi-2,1-etenediil)bis-bencenosulfónico y 4,4'-bipy es 4,4'-bipiridina), y se sintetiza a través de las reacciones hidrotermales entre 4,4'-bipy, Na_2L , junto con $\text{Zn}(\text{NO}_3)_2 \cdot 6\text{H}_2\text{O}$, que se caracteriza además mediante el análisis de difracción de rayos X monocristalino (SCXRD). Además, la muestra cristalina del CP **1** muestra una intensa luminiscencia a temperatura ambiente. Se evaluó su tratamiento en la infección recurrente de reparación de implantes después de los anestésicos orales y se exploró el mecanismo relacionado al mismo tiempo. En primer lugar, los niveles de citocinas inflamatorias liberadas en el líquido gingival se midieron con un kit de detección de ensayo inmunoabsorbente ligado a enzimas (ELISA). Además de esto, la activación del factor nuclear kappa-B (NF- κ B) en el tejido de las encías se midió con el ensayo de reacción en cadena de la polimerasa con transcriptasa inversa en tiempo real (RT-PCR).

KEY WORDS: luminescence, oral anesthetics, Zn(II) compound.

* Author to whom correspondence should be addressed. E-mail: hhh9517999@163.com