



Pt(II) complexes of oxime-containing acetylcholinesterase reactivators



Ahmed NEDZHIB,^{a)} Ivayla PANTCHEVA,^{a)} Liudmil ANTONOV,^{b)}

^{a)} Laboratory of Biocoordination and Bioanalytical Chemistry, Faculty of Chemistry and Pharmacy, "St. Kl. Ohridski" University of Sofia, 1, J. Bourchier blvd., Sofia, Bulgaria;

^{b)} Institute of Organic Chemistry with Centre of Phytochemistry, Bulgarian Academy of Sciences, Sofia, Bulgaria;
Ahmed.Nedzhib@chem.uni-sofia.bg



INTRODUCTION

- Organophosphorous compounds (OPC) are used in the agriculture as insecticides and can present serious health risks in case of improper handling or production/transportation accidents. **Chemical warfare nerve agents** (sarin, soman, tabun, VX etc.), also belonging to OPC, are classified as weapons of mass destruction according to UN Resolution 687. Both groups are irreversible inhibitors of **acetylcholinesterase** (AChE), responsible for the breakdown of acetylcholine in the synapse.
- The chemical antidotes used for treatment of OPC intoxications are known as **cholinesterase reactivators (ChR)**. The most effective ChR represent **mono- or bis-quaternary pyridinium aldoximes**. There are some difficulties in application of ChR due to their fast elimination and to the non-complete recovery of enzymatic activity.
- Universal antidotes are still not developed.

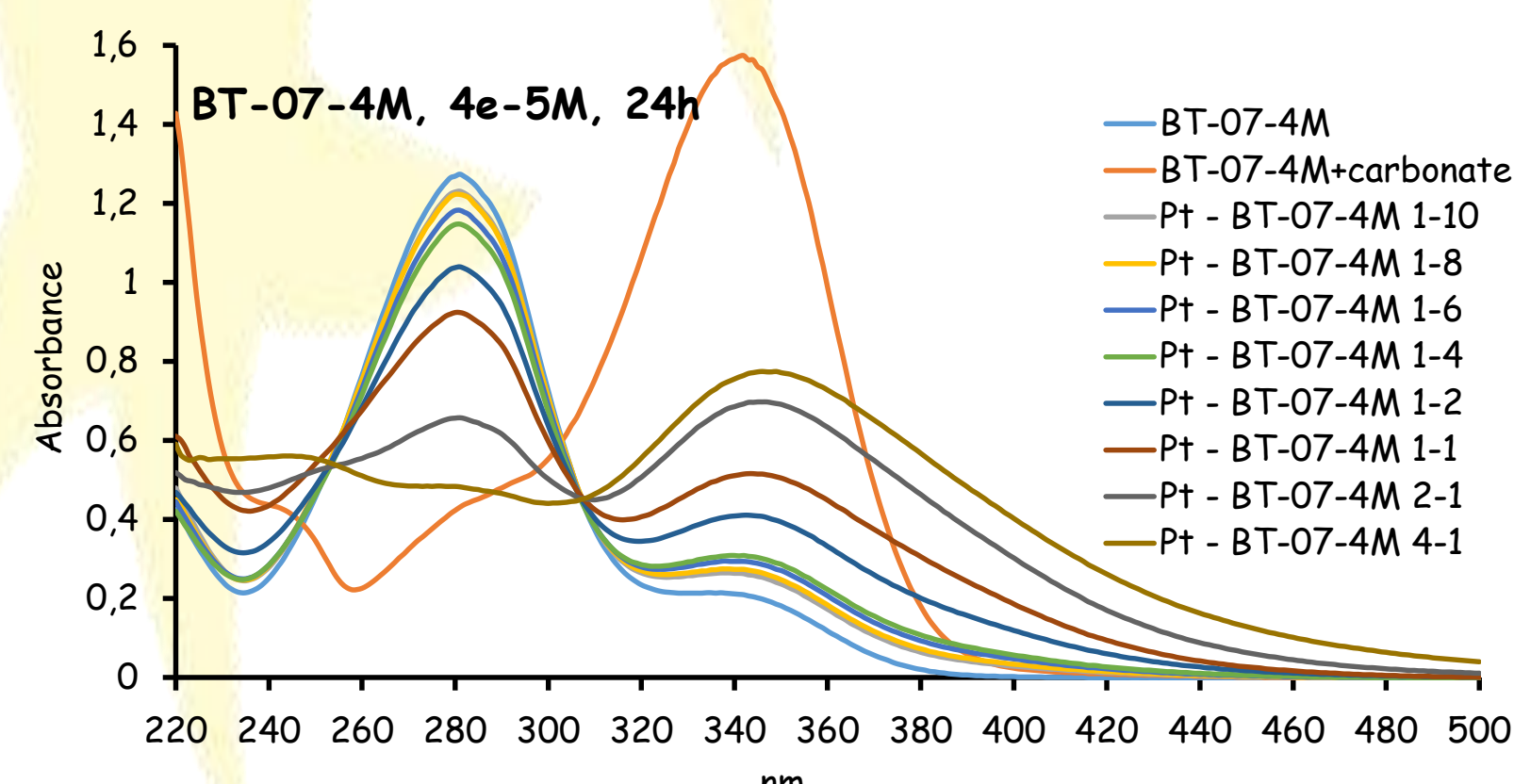
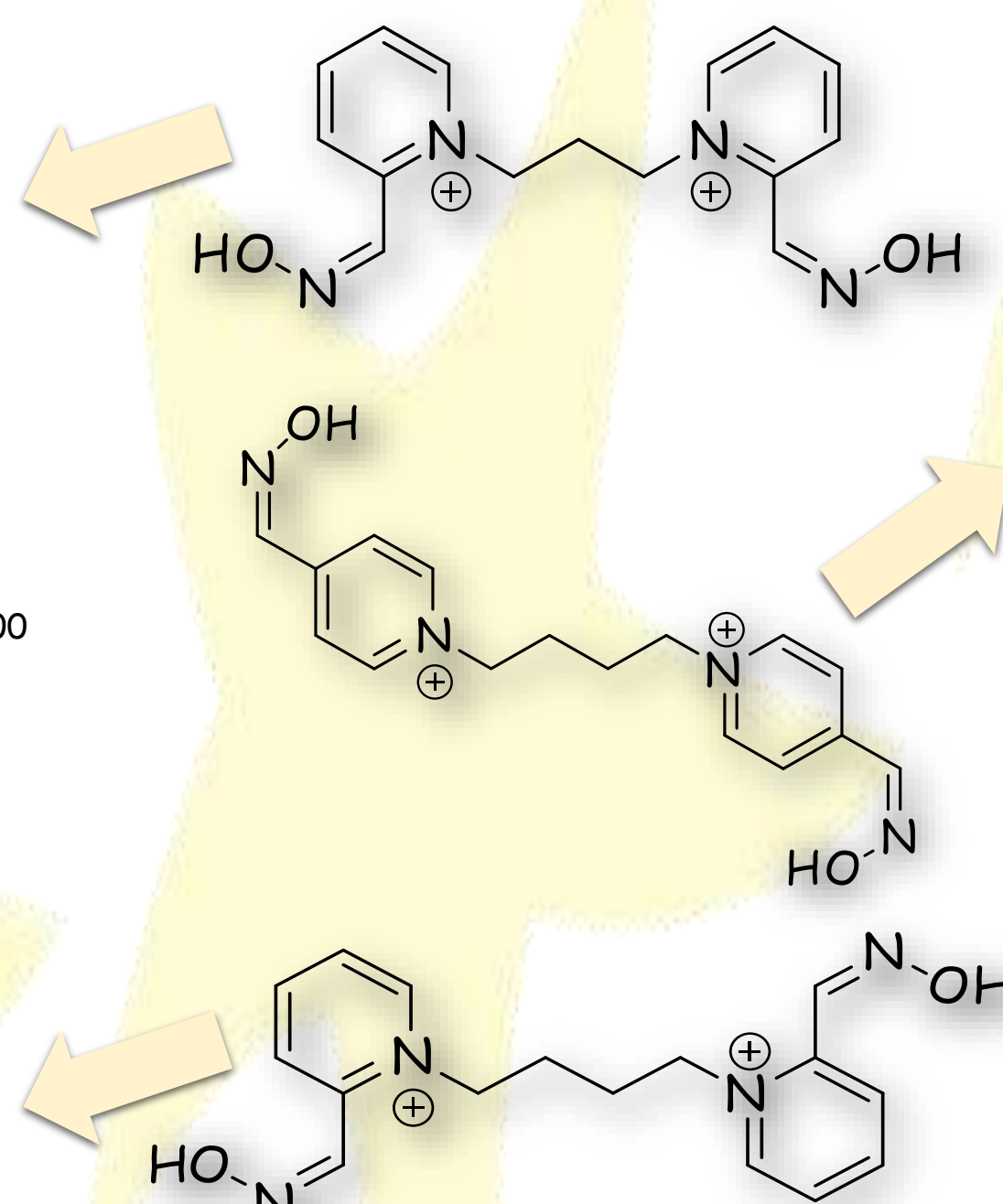
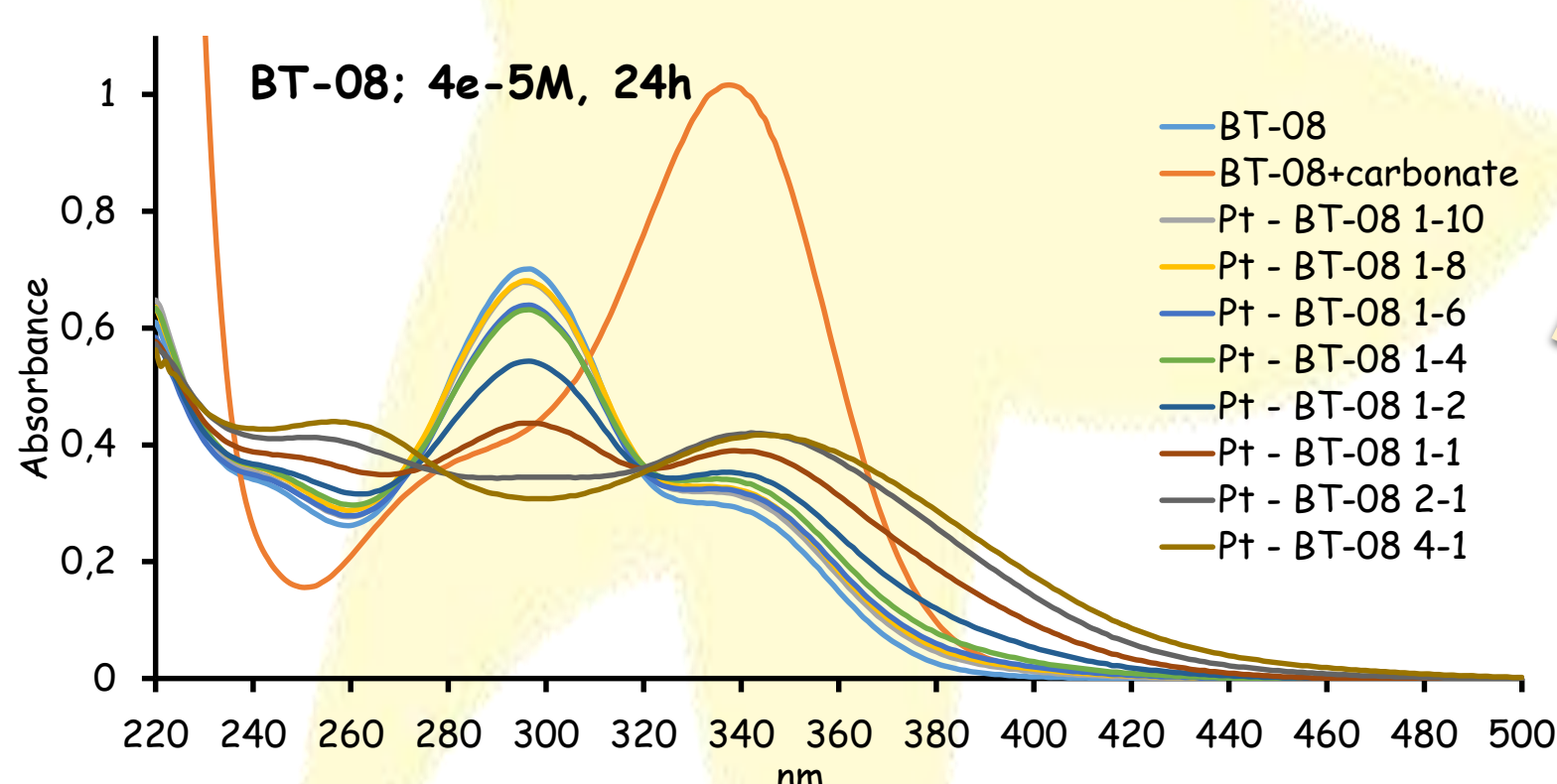
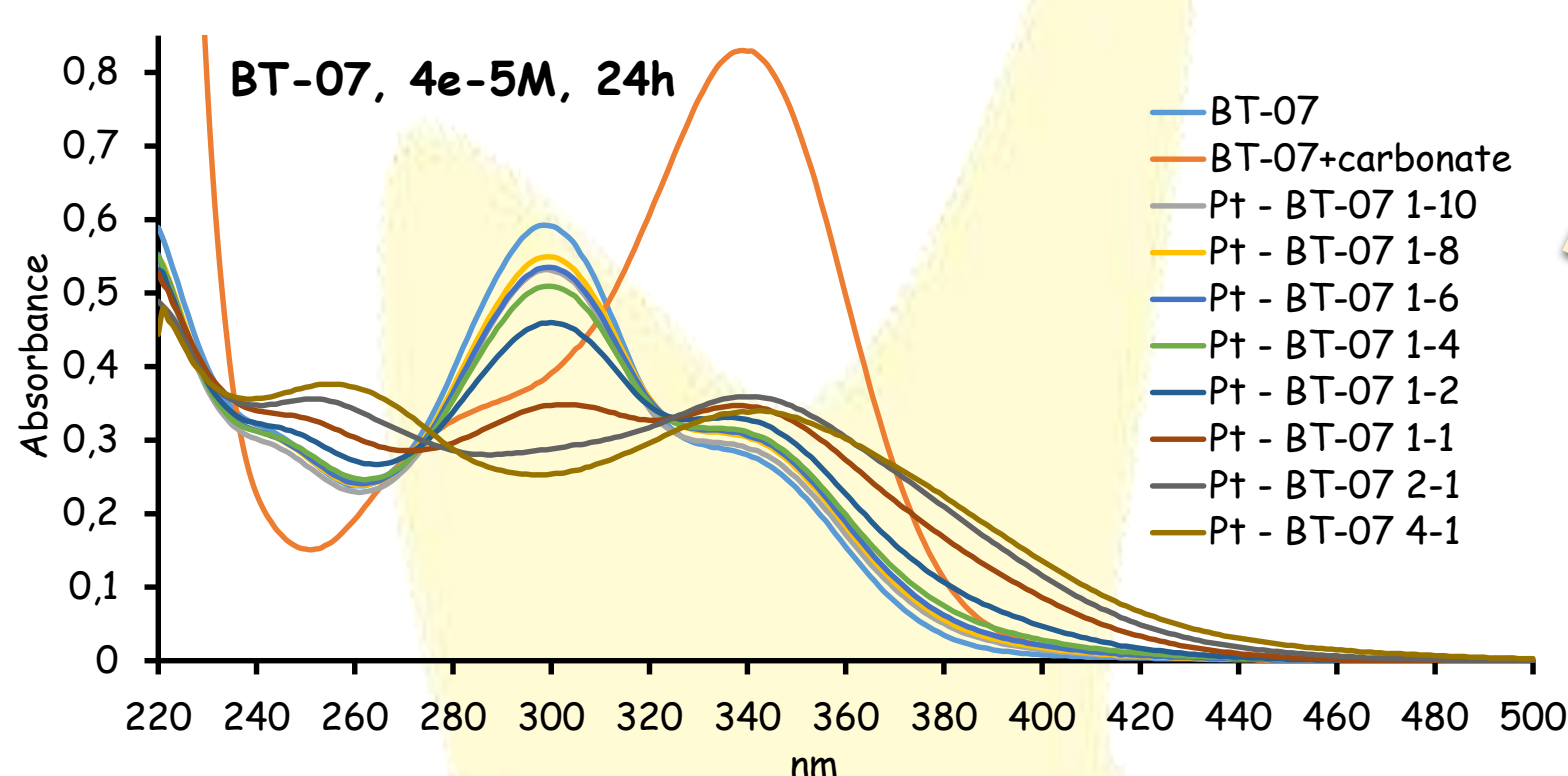
PRESENT RESEARCH

- Complexation of cholinesterase reactivators - a sufficient way to increase their efficacy (or bioavailability) in the organism.
- In the present study we report the results on ability of BT-07, BT-08 and BT-07-4M (H_2LBr_2) to bind platinum(II) ions.

METHODS

- Spectrophotometric study on complexation of Pt(II) ions ($(NH_4)_2PtCl_4$); Britton-Robinson buffer, pH 7.4; molar ratio metal-to-ligand = from 1-10 to 10-1 (Representative spectra are shown from 1-10 to 4-1);
- FINAL [1, 2] procedure was used to calculate the conversion of the starting aldoxime.

RESULTS



CONCLUSION

- From the results obtained it can be concluded that complex species of composition $[PtL]^{2+}$ appear up to 24th h after mixing the reagents and their conditional stability constants (β') was calculated (Table 1).

Complex species	$\lg\beta'$
Pt-BT-07	5.91
Pt-BT-07-4M	6.30
Pt-BT-08	6.61

Table 1. The determined conditional stability constants.

UPCOMING RESEARCH

- Isolation of the highly soluble complex species and precisely characterization of their structures.

References:

- [1] Antonov, L.; Nedeltcheva, D., Resolution of overlapping UV-Vis absorption bands and quantitative analysis. *Chem. Soc. Rev.* **2000**, 29, 217-227.
[2] Antonov, L., Absorption UV-Vis spectroscopy and chemometrics: from qualitative conclusions to quantitative analysis. In *Tautomerism: Methods and Theories*, Antonov, L., Ed. Wiley-VCH, **2013**, pp. 25-49.