

## **Calcium pathways such as cAMP modulate clothianidin action through activation of $\alpha$ -bungarotoxin-sensitive and -insensitive nicotinic acetylcholine receptors.**

Submitted by Sophie Quinchart on Thu, 10/09/2014 - 15:25

Titre	Calcium pathways such as cAMP modulate clothianidin action through activation of $\alpha$ -bungarotoxin-sensitive and -insensitive nicotinic acetylcholine receptors.
Type de publication	Article de revue
Auteur	Calas-List, Delphine [1], List, Olivier [2], Quinchart, Sophie [3], Thany, Steeve Herv� [4]
Editeur	Elsevier
Type	Article scientifique dans une revue � comit� de lecture
Ann�e	2013
Langue	Anglais
Date	2013 Jul
Pagination	127-33
Volume	137
Titre de la revue	Neurotoxicology
ISSN	1872-9711
Mots-cl�s	alpha7 Nicotinic Acetylcholine Receptor [5], Animals [6], Bungarotoxins [7], Calcium Signaling [8], Cell Line [9], Cyclic AMP [10], Dose-Response Relationship, Drug [11], Guanidines [12], Insect Proteins [13], Insecticides [14], Male [15], Membrane Potentials [16], Neurons [17], Nicotinic Agonists [18], Nicotinic Antagonists [19], Periplaneta [20], Receptors, Nicotinic [21], Second Messenger Systems [22], Thiazoles [23], Time Factors [24]

Résumé en anglais

Clothianidin is a neonicotinoid insecticide developed in the early 2000s. We have recently demonstrated that it was a full agonist of  $\alpha$ -bungarotoxin-sensitive and -insensitive nicotinic acetylcholine receptors expressed in the cockroach dorsal unpaired median neurons. Clothianidin was able to act as an agonist of imidacloprid-insensitive nAChR2 receptor and internal regulation of cAMP concentration modulated nAChR2 sensitivity to clothianidin. In the present study, we demonstrated that cAMP modulated the agonist action of clothianidin via  $\alpha$ -bungarotoxin-sensitive and insensitive receptors. Clothianidin-induced current-voltage curves were dependent to clothianidin concentrations. At 10  $\mu$ M clothianidin, increasing cAMP concentration induced a linear current-voltage curve. Clothianidin effects were blocked by 0.5  $\mu$ M  $\alpha$ -bungarotoxin suggesting that cAMP modulation occurred through  $\alpha$ -bungarotoxin-sensitive receptors. At 1 mM clothianidin, cAMP effects were associated to  $\alpha$ -bungarotoxin-insensitive receptors because clothianidin-induced currents were blocked by 5  $\mu$ M mecamylamine and 20  $\mu$ M d-tubocurarine. In addition, we found that application of 1mM clothianidin induced a strong increase of intracellular calcium concentration. These data reinforced the finding that calcium pathways including cAMP modulated clothianidin action on insect nicotinic acetylcholine receptors. We proposed that intracellular calcium pathways such as cAMP could be a target to modulate the mode of action of neonicotinoid insecticides.

URL de la notice

<http://okina.univ-angers.fr/publications/ua4850> [25]

DOI

10.1016/j.neuro.2013.04.011 [26]

Lien vers le document

<http://www.ncbi.nlm.nih.gov/pubmed/23632304> [27]

Autre titre

Neurotoxicology

Identifiant (ID) PubMed

23632304 [28]

---

## Liens

- [1] [http://okina.univ-angers.fr/publications?f\[author\]=7716](http://okina.univ-angers.fr/publications?f[author]=7716)
- [2] <http://okina.univ-angers.fr/olivier.list/publications>
- [3] <http://okina.univ-angers.fr/s.quinchard/publications>
- [4] [http://okina.univ-angers.fr/publications?f\[author\]=11297](http://okina.univ-angers.fr/publications?f[author]=11297)
- [5] [http://okina.univ-angers.fr/publications?f\[keyword\]=9167](http://okina.univ-angers.fr/publications?f[keyword]=9167)
- [6] [http://okina.univ-angers.fr/publications?f\[keyword\]=964](http://okina.univ-angers.fr/publications?f[keyword]=964)
- [7] [http://okina.univ-angers.fr/publications?f\[keyword\]=9155](http://okina.univ-angers.fr/publications?f[keyword]=9155)
- [8] [http://okina.univ-angers.fr/publications?f\[keyword\]=9156](http://okina.univ-angers.fr/publications?f[keyword]=9156)
- [9] [http://okina.univ-angers.fr/publications?f\[keyword\]=7478](http://okina.univ-angers.fr/publications?f[keyword]=7478)
- [10] [http://okina.univ-angers.fr/publications?f\[keyword\]=9157](http://okina.univ-angers.fr/publications?f[keyword]=9157)
- [11] [http://okina.univ-angers.fr/publications?f\[keyword\]=1416](http://okina.univ-angers.fr/publications?f[keyword]=1416)
- [12] [http://okina.univ-angers.fr/publications?f\[keyword\]=9158](http://okina.univ-angers.fr/publications?f[keyword]=9158)
- [13] [http://okina.univ-angers.fr/publications?f\[keyword\]=9159](http://okina.univ-angers.fr/publications?f[keyword]=9159)
- [14] [http://okina.univ-angers.fr/publications?f\[keyword\]=9160](http://okina.univ-angers.fr/publications?f[keyword]=9160)
- [15] [http://okina.univ-angers.fr/publications?f\[keyword\]=968](http://okina.univ-angers.fr/publications?f[keyword]=968)
- [16] [http://okina.univ-angers.fr/publications?f\[keyword\]=9161](http://okina.univ-angers.fr/publications?f[keyword]=9161)
- [17] [http://okina.univ-angers.fr/publications?f\[keyword\]=7990](http://okina.univ-angers.fr/publications?f[keyword]=7990)
- [18] [http://okina.univ-angers.fr/publications?f\[keyword\]=9162](http://okina.univ-angers.fr/publications?f[keyword]=9162)
- [19] [http://okina.univ-angers.fr/publications?f\[keyword\]=9163](http://okina.univ-angers.fr/publications?f[keyword]=9163)
- [20] [http://okina.univ-angers.fr/publications?f\[keyword\]=9153](http://okina.univ-angers.fr/publications?f[keyword]=9153)
- [21] [http://okina.univ-angers.fr/publications?f\[keyword\]=9164](http://okina.univ-angers.fr/publications?f[keyword]=9164)

- [22] [http://okina.univ-angers.fr/publications?f\[keyword\]=9165](http://okina.univ-angers.fr/publications?f[keyword]=9165)
- [23] [http://okina.univ-angers.fr/publications?f\[keyword\]=9166](http://okina.univ-angers.fr/publications?f[keyword]=9166)
- [24] [http://okina.univ-angers.fr/publications?f\[keyword\]=6070](http://okina.univ-angers.fr/publications?f[keyword]=6070)
- [25] <http://okina.univ-angers.fr/publications/ua4850>
- [26] <http://dx.doi.org/10.1016/j.neuro.2013.04.011>
- [27] <http://www.ncbi.nlm.nih.gov/pubmed/23632304>
- [28] <http://www.ncbi.nlm.nih.gov/pubmed/23632304?dopt=Abstract>

Publié sur *Okina* (<http://okina.univ-angers.fr>)