REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED
		FINAL 01 Jun 92 To 30 Nov 94

4. TITLE AND SUBTITLE
BIOPHYSICAL AND BIOCHEMICAL MECHANISMS IN SYNAPTIC TRANSMITTER RELEASE

5. FUNDING NUMBERS
F49620-92-J-0363
61102F
2312/BS

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AFOSR-TR- 95-0420

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Bolling AFB DC 20332-0001
Dr Genevieve M. Haddad

10. SPONSORING / MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES

12a. DISTRIBUTION / AVAILABILITY STATEMENT
Approved for public release;
distribution unlimited

12b. DISTRIBUTION CODE

13. ABSTRACT *(Maximum 200 words)*

The project on synaptic transmission in the squid giant synapse was supported from years 1989 to 1994, and was discontinued due to a drastic reduction of funding to this branch of the Air Force Biological Research Program. Over the period of its tenure many fundamental discoveries were reported from the work supported by this grant. Among them (1) The discovery of P type calcium channels as the main trigger for transmitter release in invertebrates and vertebrate synapses, to include mammalian forms; (2) The first demonstration of calcium microdomains in presynaptic terminals and their role in synaptic transmitter release. In addition, measurements were also done of the maximum concentration attained at these microdomains and the time course for the calcium concentration profile; (3) The mechanisms by which botulinum and tetanus toxin block synaptic release; (4) Finally, the role of high inositol phosphate moieties in synaptic release were also studied.

14. SUBJECT TERMS			15. NUMBER OF PAGES
			16. PRICE CODE
17. SECURITY CLASSIFICATION OF REPORT (U)	18. SECURITY CLASSIFICATION OF THIS PAGE (U)	19. SECURITY CLASSIFICATION OF ABSTRACT (U)	20. LIMITATION OF ABSTRACT (U)

THE FINAL REPORT ON AIR FORCE GRANT F49620-92-J-0363

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1. Llinás, R., Sugimori, M., Lin, J.W., and Cherksey, B. Blocking and isolation of calcium channel from neurons in mammals and cephalopods utilizing a toxin fraction (FTX) from funnel-web spider poison. **Proc. Natl. Acad. Sci., USA,** 86:1689-1693 (1989).

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Sellin, R. Libelius, S. Thesleff. Amsterdam; Elsevier/Holland, Chapter 8, pp 101-109 (1989).

4. McGuinness, T., Brady, S., Gruner, J., Sugimori, M., Llinás, R., and Greengard, P. Phosphorylatin-dependent inhibition by synapsin I of organelle movement in squid axoplasm. **J. Neuroscience,** 9(12):4138-4149 (1989).

5. Lin, J.W., Sugimori, M., Llinas, R., McGuinness, T., and Greengard, P. Effects of synapsin I and calcium/calmodulin-dependent protein kinase II on spontaneous neuro-transmitter release in the squid giant synapse. **Proc. Natl. Acad. Sci. USA** 87(21):8257-8261 (1990).

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13. Lin, J.W., and Llinás, R. Depolarization activated potentiation of the t-fiber synapse in the blue crab. **J. Gen. Physiology**, 101:45-65 (1993).

14. Brady, S.T., Sugimori, M., Leopold, P.L., Lin, J.-W., Chu, D.S., and Llinás, R. Activity-dependent inhibition of neurotransmitter release by Brefeldin, A. **Biol. Bull.** 185:299-300 (1993).

15. Llinás, R., Sugimori, M., and Silver, R. Localization of calcium concentration microdomains at the active zone in the squid giant synapse. In: Molecular and Cellular Mechanisms of Neurotransmitter Release. eds.,

Stjarne/Greengard/Grillner/Hokfelt/Ottoson, Raven Press, NY, Chapter 9, pp 133-137 (1994)

16. Llinás, R., Sugimori, M., Chu, D., Morita, M., Blasi, J., Herreros, J., Jahn, R., and Marsal, J. Tetanus toxin blocks transmission at the squid giant synapse by affecting synaptobreven, a synaptic-vesicle-bound protein. **J. Physiology**, 477(1):129-133 (1994).

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