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**CILIA**

**Customized Intelligent Life-Inspired Arrays**

Integrated Project

Information Society Technologies  
Future & Emerging Technologies  
Proactive Initiative BIO-I3

**DELIVERABLE: D2.1.2 – Executive Summary**

ELECTROPHYSIOLOGICAL CHARACTERISATION OF  
CULTIVATED INSECT NEURONS

<b>Actual submission date:</b>	May 30, 2006	
<b>Start day of project:</b>	September 1st, 2005	<b>Duration:</b> 48 months

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## **1. EXECUTIVE SUMMARY**

The electrophysiological properties of cultured cricket and locust neurons were characterized in detail using the whole cell patch clamp technique. According to their ability to generate action potentials and characteristics of ionic currents the neurons were grouped into non-spiker, single-spiker, and burster. At least two of different classes of neurons with distinguished properties, non-spiker and burster can also be found *in vivo*.

The functionality of morphological connections between single neurons was investigated using double patch clamp recordings. In most cases the signal transmission was unidirectional with a latency in the millisecond range indicating chemical synapses between the neurons. Signal transduction with no latency, which is indicative of electrical synapses, was also observed, but occurred rarely.

The synaptic trigger threshold of locust chemical synapses was approximately  $-35$  mV, which corresponds to the trigger currents of HVA  $Ca^{2+}$ -channels.