

ANNUAL PUBLICATIONS

Department of Maxillofacial Biology Cognitive Neurobiology

1993.1.-2000.3.

I. Staff and Student (April, 1999)

Professor	A. Iriki
Lecturer	K. Toda
	Y. Sahara
Research Associate	N. Katakura
Technician	M. Oguro
	M. Nakajima
Postdoctoral Associate	H. Ishibashi
Teaching Assistant	S. Ohbayashi
Research Technician	S. Hihara
	M. Takahashi
	T. Notoya
Graduate Student	H. Yokochi
Research Student	M. Matsumoto

II. Educational outlines of graduate course

- 1) The objective of oral physiology course is the understanding of key features and mechanisms of functional activities of oral-facial structures.

The main objective of postgraduate course is research and teaching of the neural mechanisms underlying motor and sensory functions of the stomatognathic structure, which is regarded as the masticatory organ from the standpoint of dental medicine aiming at development and maintenance of the normal masticatory function.

- 2) The objective of cognitive neurobiology course is the understanding of key features and mechanisms of the human intelligence, such as symbol manipulation and language.

The main objective of postgraduate course is research and teaching of the molecular, cellular and neural mechanisms underlying tool-manipulation in monkey prefrontal cortex. Such an operation may represent evolutionary precursors to higher cognitive function of the human brain.

III. Research Subjects

- 1) Brain mechanisms of symbol manipulation.
- 2) Analysis of oro-facial sensory mechanisms in an in vitro preparation.
- 3) Molecular structure and functions of ligand-gated receptor channels and voltage-gated ion channels.
- 4) Brainstem mechanisms underlying rhythmical ingestive movements in isolated CNS preparations from early postnatal rodents.

IV. Publications (1993-1999)

A. Original Articles

- 1) Nakamura Y.: Brainstem mechanisms underlying rhythmical chewing movements. Chin. Dent. J., 12, 79-80, 1993.
- 2) Nozaki S., Iriki A., Nakamura Y.: Trigeminal premotor neurons in the bulbar parvocellular reticular formation participating in induction of rhythmical activity of trigeminal motoneuron by repetitive stimulation of the cerebral cortex in the guinea pig. J. Neurophysiol., 69, 595-608, 1993.
- 3) Sahara Y., Westbrook G. L.: Modulation of calcium currents by a metabotropic glutamate receptor involves fast and slow kinetic components in cultured hippocampal neurons. J. Neurosci., 13, 3041-3050, 1993
- 4) Katayama T., Kohase H., Nakamura Y.: Resetting of cortically induced rhythmical jaw movements by stimulation of the cerebellar interpositus nucleus in the guinea pig. Brain Res., 617, 143-146, 1993.
- 5) Takemura N., Fujita Y., Toda K.: Function of oralis muscles estimated by evoked EMG. Report of Jaw movements and EMG, 11, 11-16, 1993 (In Japanese).
- 6) Ono T., Ishiwata Y., Inaba Y., Nakamura Y.: Hypoglossal premotor neurons with rhythmical inspiratory-related activity in the cat; localization and projection to the phrenic nucleus. Exp. Brain Res., 98, 1-12, 1994.

- 7) Iwata K., Tsuboi Y., Yagi J., Toda K., Sumino R.: Effects of interstimulus interval on perceived sensation and kntradental nerve activity during thermal tooth pulp stimulation in man. *Brain Res.*, 635, 211-216, 1994.
- 8) Kimura N., Arai K., Sahara Y., Suzuki H., Kimura N.: Estradiol transcriptionally and posttranscriptionally up-regulates thyrotropin releasing hormone receptor messenger ribonucleic acid in rat pituitary cells. *Endocrinol.*, 134, 432-440, 1994.
- 9) Toda K.: Actions of endogenous serotonin on nociceptive responses of descending neurons in the rat anterior cingulate cortex. *Pain Res.*, 9, 87-93, 1994.
- 10) Katakura N., Liu J., Nakamura Y.: NMDA-induced rhythmical activity in XII nerve of isolated CNS from newborn rats. *Neuroreport*, 6, 601-604, 1995.
- 11) Toda K., Ishii N. Nakamura Y.: An in vitro jaw-nerve preparation for oral sensory study in the rat. *J.Neurosci. Method.*, 61, 85-90, 1995.
- 12) Enomoto S., Kohase H., Nakamura Y.: Dual brain stem projection from the cortical masticatory area in guinea-pig. *Neuroreport*, 6, 1573-1577, 1995.
- 13) Sahara Y., Hashimoto N., Nakamura Y.: Hypoglossal premotor interneurons in the rostral bulbar reticular formation participate in cortically-induced rhythmical tongue movement in the cat. *Neurosci. Res.*, 26, 119-131, 1996.
- 14) Kutsuwada T., Sakimura K., Manabe T., Takayama C., Katakura N., Kushiya E., Natsume R., Watanabe M., Inoue Y., Yagi T., Aizawa S., Arakawa M., Takahashi T., Nakamura Y., Mori H., Mishina M: Impairment of suckling response, trigeminal neuronal pattern formation, and hippocampal LTD in NMDA receptor ϵ 2 subunit mutant mice. *Neuron*, 16, 333-344, 1996
- 15) Miyahara T., Hagiya N., Ohyama T., Nakamura Y.: Modulation of human soleus H reflex in association with voluntary clenching of the teeth. *J. Neurophysiol.*, 76, 3033-2041, 1996
- 16) Yamamura H., Iwata K., Tsuboi Y., Toda K., Kitajima K., Shimizu N., Nomura H., Hibiya J., Fujita S., Sumino R.: Morphological and electrophysiological properties of ACCx nociceptive neurons in rats. *Brain Res.*, 735, 83-92, 1996.
- 17) Sasaki K., Fujita Y., Toda K., Soma K.: Role of labial sensation in mastication:Changes of jaw movements after local anesthetization of lips. *J. Oral Function*, 2, 83-96, 1996 (In Japanese).
- 18) Toda K, Ishii N, Nakamura Y: Characteristics of mucosal nociceptors in the rat oral cavity: An in vitro study. *Neurosci. Lett.*, 228, 95-98, 1997.
- 19) Sahara Y., Noro N., Iida Y., Soma M., Nakamura Y.: Glutamate receptor subunit GluR5 and KA-2 are coexpressed in rat trigeminal ganglion neurons. *J. Neurosci.* 17, 6611-6620, 1997.
- 20) Liu J.: Localization of central rhythm generator for tongue movements in sucking -analysis of isolated brainstem-spinal cord preparation from newborn rats-. *J. Stomatol. Soc. Jpn.*, 64, 8499-511, 1997 (in Japanese) .
- 21) Toda K, Seki Y, Ishii N, Soma K, Nakamura Y : Tooth pulpal nociceptors in the rat lower incisor: An in vitro study. *Pain Res.*, 13, 57-63, 1998.
- 22) Jones MV, Sahara Y, Dzubay JA, Westbrook GL: Defining affinity with GABAA receptor. *J. Neurosci.* 18: 8590-8604, 1998.
- 23) Clements J. D., Feltz A., Sahara Y., Westbrook G. L.: Activation kinetics of AMPA receptor channels reveal the number of functional agonist binding sites. *J. Neurosci.* 18, 119-127, 1998.
- 24) Schoppa N. E., Kinzie J. M., Sahara Y., Segerson T. P., Westbrook G. L.: Dendrodendritic inhibition in the olfactory bulb is driven by NMDA receptors. *J Neurosci* 18, 6790-6802, 1998.
- 25) Jones M. V., Sahara Y., Dzubay J. A., Westbrook G. L.: Defining affinity with GABAA receptor. *J. Neurosci.* 18, 8590-8604, 1998.
- 26) Nakajima M.: Brainstem segmental arrangement of sucking rhythm generators for trigeminal, facial and hypoglossal motoneurons. *J. Stomatol. Soc. Jpn.*, 66, 88-97, 1999 (in Japanese) .
- 27) Sahara Y., Gotoh M., Konno K., Miwa A., Tsubokawa H., Robinson H. P. C., Kawai N.: A new class of neurotoxin from wasp venom slows inactivation of sodium current. *Eur. J. Neurosci* . 12, 1961-1970, 2000.

B. Books

- 1) Toda K.: Mechanisms of Pain. in *TMJ Handbook*, Nihon Shika Hyouronsha, (Tokyo), 1993 (In Japanese).
- 2) Yamaada T., Toda K., Eishi Y., Kitahaara M., Kimoto M., Iwata M.: *Physiology*. Asakura Shoten (Tokyo), 1993 (in Japanese).
- 3) Toda K.: *Anatomy and Physiology*. JWU press (Tokyo), 1994 (in Japanese).
- 4) Miyazawa Y., Toda K.: *Recent research in acupuncture-Europa-*. Medscience Sha, (Tokyo), 1994 (in Japanese).
- 5) Kimoto A, Enomoto S, Kobayashi S, Ohashi I., Nakamura Y.: Responses of trigeminal mesencephalic neurons to teeth extraction in the guinea pig. In: T. Morimoto, T. Matsuya and K. Takada (eds.), *Brain and Oral Functions- Oral Motor Function and Dysfunction*. Elsevier, Amsterdam, pp. 49-58, 1995.
- 6) Sahara Y., Nakajima M., Nakamura Y.: Sodium currents in the rat trigeminal ganglion neurons. (Eds) T. Morimoto, T. Matsuya

- and K. Takada. In Brain and Oral Functions- Oral Motor Function and Dysfunction. Elsevier, Amsterdam, pp. 295-298, 1995.
- 7) Katakura N., Nakamura Y.: Induction of rhythmical activity in XII of isolated CNS from newborn rats. In: T. Morimoto, T. Matsuya and K. Takada (eds.), Brain and Oral Functions-Oral motor function and dysfunction. Elsevier, Amsterdam, 307-311, 1995.
 - 8) Kobayashi S, Enomoto Y Nakamura Y & Nagao M (1995) Short latency responses of masseter muscles to loading and unloading in complete denture wears. In: T. Morimoto, T. Matsuya and K. Takada(eds.), Brain and Oral Functions- Oral Motor Function and Dysfunction. Elsevier, Amsterdam, pp. 353-356, 1995.
 - 9) Ohashi I., Enomoto S., Katakura N., Yoshida T., Nagao M., Nakamura Y.: Effects of pain relief on latencies of jaw jerk in patients with craniofacial pain. In: T. Morimoto, T. Matsuya and K. Takada (eds.), Brain and Oral Functions-Oral motor function and dysfunction. Elsevier, Amsterdam, 489-493, 1995.
 - 10) Miyazawa Y., Toda K.: Recent research in acupuncture-UK-. Sogo Iryou Kenkyusho, (Tokyo), 1996 (in Japanese).
 - 11) Sahara Y.: Ligand binding sites and subunit composition of the ionotropic glutamate receptors. In: Neurobiology of Mastication. Eds., Nakamura Y, Sessle B J, (Elsevier, Amsterdam), 42-55, 1999.
 - 12) Ikeda H, Goto M, Sahara Y, Suda H, Nakamura Y.: Nystatin perforated whole-cell recordings from feline odontoblasts. In: Neurobiology of Mastication. Eds., Nakamura Y, Sessle B J, (Elsevier, Amsterdam), 72-82, 1999.
 - 13) Toda K, Nasution F, Seki Y, Ishii N, Ogawa T, Soma K, Nakamura Y: Subtypes of oral mucosal nociceptors:an in vitro study in rats. In: Neurobiology of Mastication. Eds., Nakamura Y, Sessle B J, (Elsevier, Amsterdam), 189-200, 1999.
 - 14) Katakura N., Nakajima M., Nakamura Y.: Ontogenic analysis of brainstem mechanisms of ingestive activities in vitro. In: Neurobiology of Mastication. Eds., Nakamura Y, Sessle B J, (Elsevier, Amsterdam), 312-326, 1999.
 - 15) Toda K, Nasution F H, Seki Y, Ogawa T, Kumei Y, Kimoto M: Responses of oral mucosal nociceptors to bitter solutions in an in vitro rat jaw-nerve preparation, In : Primary Nociceptive Neuron . Eds., Kress M, Reeh P W, Vyklicky L, (Teris, Prague), 111, 1999.
 - 16) Toda K: Neurophysiological mechanisms of Acupuncture analgesia. In East-West Medicine, Ed. Min B I, (Kyunghee Univ.Press), 45-53, 1999.

C. Review Articles

- 1) Toda K.: Descending antinociceptive system. J. Dent. Orient. Med., 12, 1-11, 1993 (in Japanese).
- 2) Nakamura Y., Katakura N.: Generation of masticatory rhythm in the brainstem. Neurosci. Res., 23, 1-19, 1995.
- 3) Sahara Y.: Ligand-gated receptor channels. Brain Science, 21(Suppl), 23-27, 1999. (in Japanese).
- 4) Nakamura Y.: Roles of cerebral cortex in control of masticatory movements. J. Stomatol. Soc. Jpn., 66, 311-320, 1999 (in Japanese) .
- 5) Iriki A.: Research strategy of cognitive neurobiology challenging brain mechanisms of the human intelligence. J. Stomatol. Soc. Jpn., 66, 321-330, 1999 (in Japanese) .
- 6) Nakamura Y., Katakura N., Nakajima M.: Generation of rhythmical food ingestive activities of the trigeminal, facial, and hypoglossal motoneurons in in vitro CNS preparations isolated from rats and mice. J. Med. Dent. Sci., 46 (2), 63-73, 1999.
- 7) Katakura N.: Analysis of neuronal circuits in isolated brainstem-spinal cord preparations. Brain Science, 22, 79-83, 2000. (in Japanese).
- 8) Iriki A.: Cognitive neurobiology of the "subjective body image". Brain Science, 22, 265-274, 2000. (in Japanese).
- 9) Toda K.: Oral mucosal Nociceptors. J. Dent. Orient. Med.,18, 1-9, 1999 (in Japanese).
- 10) Toda K.: Nociceptors in the oral mucosa. J. Neurosci. Pain Res., 2, 5-11, 2000.