The different inductions obtained with bone marrow in different phases of competence, expressed as percentages of all available cases (% total) as well as percentages of all positive (mesenchymal, mesodermal, and neural) cases (% pos.)

	A			B			C			D	
	Cases	% total	% positive	Cases	% total	% positive	Cases	% total	% positive	Cases	% total
Total	14	100		24	100		31	100		13	100
Atyp. epidermis	14	100		23	96		31	100		13	100
Norm. epidermis	11	79		15	63		17	55		2	15
Positive	13	93	100	11	46	100	15	48	100	(2)	(15)
Mesenchyme	9	64	69	2	8	18	7	23	47	(2)	(15)
Melanophores	9	64	69	10	42	91	11	35	73	–	–
Mesodermal	7	50	54	–	–	–	1	3	7	–	–
Notochord	4	29	31	–	–	–	1	3	7	–	–
Muscle	3	21	23	–	–	–	1	3	7	–	–
Fin	6	43	46	–	–	–	–	–	–	–	–
Neural	10	71	77	6	25	55	8	26	53	–	–
Spinal cord	7	50	54	–	–	–	1	3	7	–	–
Deuterencephalic	2	14	15	–	–	–	–	–	–	–	–
Archencephalic	–	–	–	3	13	27	2	6	13	–	–
Neuroid	2	14	15	3	13	27	5	16	33	–	–

owing to an error in experimental technique. No inductions occurred in those cases where the implant was not found.

The results indicate that after about 12 h the mesodermal competence of the ectoderm is for the most part lost and only the neural competence, itself reduced, is left until early neurula stage. It would seem that in vivo the competences tended to be lost slightly earlier than in vitro[1]. What is more important is the occurrence of the same competence phases in the same sequence. This would suggest that the loss of competence is an autonomous process not remarkably influenced by the neighbouring tissues in the intact gastrula.

Contrary to the results of TSENG[3], who used the same method but a different species, *Cynops orientalis*, no shift towards more ventral mesodermal structures during the loss of competence was found in the present experiments, which is more in accordance with the work of GEBHARDT and NIEUWKOOP[4] with lithium-treated *Ambystoma* ectoderm, as well as with my own experiments with *Triturus* ectoderm in vitro. More work is certainly needed before we have a clear picture of the response of the aging ectoderm to mesodermal induction.

Résumé. Des expériences ont été effectuées pour déterminer l'action inductrice de la moelle osseuse sur l'ectoderme de la gastrule agée de *Triturus vulgaris*. Un Tableau et une Figure en présentent les résultats.

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[3] M.-P. TSENG, Acta biol. exp. sinica *8*, 230 (1963).

[4] D. O. E. GEBHARDT and P. D. NIEUWKOOP, J. Embryol. exp. Morph. *12*, 317 (1964).

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Responses Evoked by Stimulation of the Acoustic Pathway During the Sleep-Wakefulness Cycle[1]

Since thalamic transmission and cortical responsiveness are strictly related to the level of vigilance in both somatic[2–4] and visual[5,6] sensory systems, an analysis of possible functional changes occurring in the acoustic pathway during the sleep-wakefulness cycle has been undertaken. 14 adult cats carrying electrodes chronically implanted into the inferior quadrigeminal brachium (IQB), acoustic radiations (AR), and over middle and posterior ectosylvian giri (primary auditory areas) have been used. For detailed technical information regarding the exact location of the electrodes, the technique used within the experimental sessions and the statistical evaluation of results, the reader is referred to DAGNINO et al.[7,8].

Results. A. (Figure 1) The postsynaptic components of the cortical response evoked by stimulation of IQB (a positive-negative deflection, initial latency 2.0–3.5 msec) showed, on arousal from light sleep, a significant amplification in 65% of the trials. An even greater and more constant (90%) increase in amplitude occurred when the animal fell into deep sleep, while on subsequent arousal

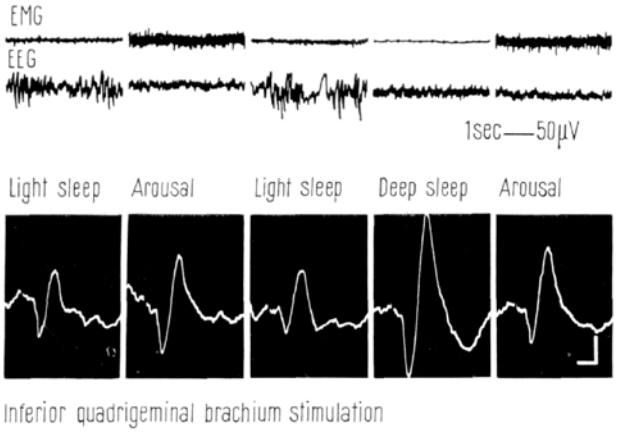

Fig. 1. Responses evoked on the auditory cortex upon stimulation of the inferior quadrigeminal brachium during the different stages of sleep and during arousal. Calibration: 50 μV. Time base: 5 msec.

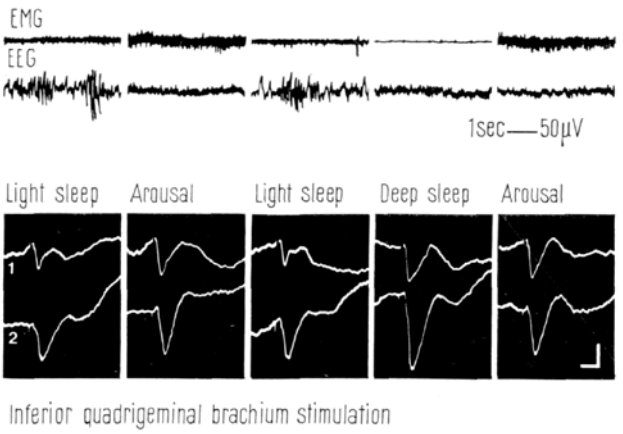

Fig. 2. Responses evoked in the acoustic radiations (1) and on the auditory cortex (2) upon stimulation of the inferior quadrigeminal brachium during the different stages of sleep and during arousal. Calibration: 50 μV. Time base: 5 msec.

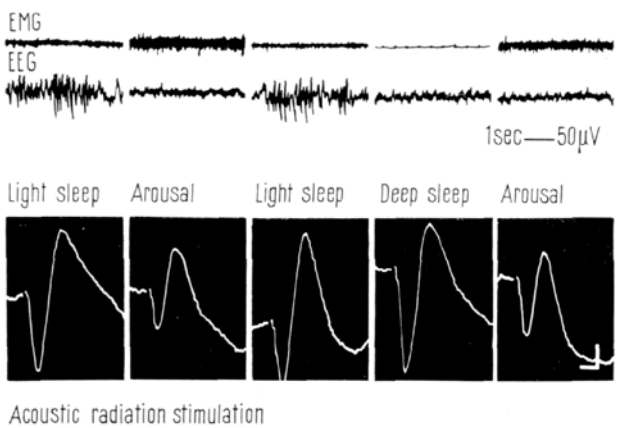

Fig. 3. Responses evoked on the auditory cortex upon stimulation of the acoustic radiations during the different stages of sleep and during arousal. Calibration: 50 μV. Time base: 5 msec.

responses appeared significantly reduced in 69% of the trials. B. (Figure 2) The response simultaneously recorded from the AR (a positive deflection, initial latency 0.8–1.2 msec) appeared constantly and significantly increased during both arousal and deep sleep stages as compared to light sleep, while no significant changes usually occurred on arousal from deep sleep. C. (Figure 3) The postsynaptic components of the cortical response upon AR stimulation (a positive-negative deflection, initial latency 1.6–2.0 msec) appeared significantly reduced on arousal from both light and deep sleep in 62% and 89% of the trials respectively, while the comparison of the last two stages did not show clear-cut differences.

Conclusions. Assuming the amplitude of inferior quadrigeminal brachium-radiation and radiation-cortical responses as a reliable estimate of geniculate transmission and cortical responsiveness respectively, it can be safely concluded that: (1) Increased geniculate transmission and reduced cortical responsiveness are the main functional changes occurring in the acoustic pathway during arousal from light sleep. The increased geniculate output is generally able to overcome the relative cortical refractoriness and therefore to amplify cortical responses evoked by stimulation of the IQB. (2) The facilitation of afferent transmission at the geniculate level represents the main functional change occurring in the acoustic pathway during deep sleep as compared to the light sleep stage. In fact, cortical responsiveness, at least in the majority of the cases, does not show constant modifications. These data suggest that amplification of cortical responses upon pre-geniculate stimulation observed during deep sleep is mainly due to facilitated geniculate transmission. (3) On arousal from deep sleep, cortical responsiveness is almost constantly decreased, no steady changes occurring at the geniculate level. This could suggest that reduction of cortical responses upon pre-geniculate stimulation observed during arousal from light sleep is mainly cortical in origin.

Riassunto. Lo studio delle risposte evocate nelle radiazioni acustiche e nelle aree acustiche primarie da stimolazione delle vie uditive centrali dimostra che: (a) la trasmissione degli impulsi ascendenti a livello del corpo genicolato mediale è facilitata sia durante il sonno profondo che al risveglio mentre, (b) l'eccitabilità corticale è maggiore durante il sonno leggero.

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Università di Genova (Italy), October 29, 1964.

[1] Part of these results has been presented at a meeting of the Società italiana di Biologia sperimentale, held in Genova on July 30, 1964.
[2] E. FAVALE, C. LOEB, and M. MANFREDI, Exper. *19*, 189 (1963).
[3] E. FAVALE, C. LOEB, and M. MANFREDI, Arch. int. Physiol. Biochim. *71*, 229 (1963).
[4] E. FAVALE, C. LOEB, M. MANFREDI, and G. SACCO, Electroenceph. clin. Neurophysiol., *18*, 354 (1965).
[5] E. FAVALE, C. LOEB, and M. MANFREDI, Arch. int. Physiol. Biochim. *72*, 221 (1964).
[6] N. DAGNINO, E. FAVALE, C. LOEB, and M. MANFREDI, J. Neurophysiol. *28*, 443 (1965).
[7] N. DAGNINO, E. FAVALE, C. LOEB, and M. MANFREDI, Boll. Soc. ital. Biol. sper. *40*, 1434 (1964).
[8] N. DAGNINO, E. FAVALE, C. LOEB, and M. MANFREDI, Boll. Soc. ital. Biol. sper. *40*, 1437 (1964).