RELEASE OF OXYTOCIN ELICITED BY SUCKLING STIMULUS IN MARES

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The neurohypophysial hormone, oxytocin, is released in response to both external and internal neural stimuli. There is considerable published evidence indicating that release of oxytocin is elicited by the suckling or milking stimulus in the cow (Folley & Knaggs, 1965; Hays & Pritchard, 1967), the goat (Hawker & Roberts, 1957), and the sheep (Fitzpatrick, 1961). There is no published report on the release of oxytocin during suckling in mares, however, and this communication presents the results of the effect of a suckling stimulus on the release of oxytocin in a lactating mare.

The effect of a suckling stimulus was examined in eight mares, all of which were studied less than 1 month after parturition. Foals were isolated from their dams for a period of 5 to 10 hr. A blood sample collected 15 min before initiation of nursing served as a control. Further blood samples were collected at 30 sec, and 1, 2, 3, 4, 5, 10, 15 and 20 min after suckling. The foal was allowed to suck for the initial 3 min. Approximately 10 ml blood was collected in a heparinized tube at each time interval and the plasma was separated and frozen at -19°C within 50 min of blood collection. The frozen plasma samples were thawed, equilibrated at 5°C and assayed for oxytocin by the technique of Van Dongen & Hays (1964).

In seven of the eight mares tested, the control sample contained no detectable oxytocic activity (OA), but OA of the order of 1.03×10^{-6} i.u./ml was present in Mare 5. In all mares tested, the sample collected 30 sec after the initiation of nursing showed an abrupt increase in OA to amounts of the order of 1.25×10^{-4} and 1×10^{-3} i.u./ml (Mares 3, 6 and 8). The concentration at 30 sec after the initiation of nursing was the peak OA for their entire series of blood samples. The peak OA (1.1×10^{-2} to 1×10^{-4} i.u./ml) in all mares occurred within the first 5 min after the initiation of nursing (Table 1). Once the peak was obtained, a decline of OA occurred. In no case, however, was there a complete absence of OA at the end of the 20 min of serial sampling (Text-figs 1 and 2). In Mares 3, 7 and 6, a second OA peak appeared 15 min after the initiation of nursing (Text-fig. 2). Owing to this, the pattern of OA decline in these mares was unlike that observed in other mares. At least in Mare 6, the second peak may be explained by the fact that the mare could no longer be restrained at 12 min and the foal again began to suck, causing the second peak. The OA in the control sample of Mare 5 may be due to some other unknown factor. Since all samples collected 20 min after the start of nursing showed OA, it is difficult

Table 1. Concentration of oxytocic activity in mares at indicated times after the initiation of nursing

Mare no.	OA 30 sec after initiation of nursing	Peak OA	OA 20 min after initiation of nursing
1	1.03×10^{-6}	1×10^{-4} 3 min	1.06×10^{-8}
2	1.08×10^{-4}	1.1×10^{-2} 1 min	1.02×10^{-8}
3	1.25×10^{-4}	1.25×10^{-4} 1-3 min	1.08×10^{-5}
4	1.05×10^{-6}	1.1×10^{-4} 4 min	$1 \times 10^{-7*}$
5	1.03×10^{-3}	1.36×10^{-3} 2 min	1.07×10^{-7}
6	1×10^{-3}	1×10^{-3} 2, 3, 15 min	1×10^{-6}
7	1.02×10^{-5}	1.21×10^{-4} 2 min	1.14×10^{-7}
8	1×10^{-2}	1.1×10^{-2} 1 min	1.02×10^{-8}

OA = oxytocic activity in i.u./ml blood plasma.

* OA 15-min concentration because 20-min sample was lost.

to state how long it would take to inactivate circulating levels of OA in a lactating mare.

The OA in the plasma of the mares ranged from 1.1×10^{-2} to 1×10^{-4} i.u./ml. Analogous results were also reported using the same bioassay technique in the cow, i.e. 1×10^{-3} i.u./ml (Sybesma, 1968), and 1×10^{-4} i.u./ml (Hays & Pritchard, 1967). The bioassay technique used to quantify OA in the plasma samples has a very high sensitivity (1×10^{-9} i.u./ml) and is very specific. At very low concentrations, however, the technique is not very precise.

Results from the present study indicate that nursing elicits the release of oxytocin (1×10^{-2} to 1×10^{-4} i.u./ml) in mares and that a level of 1×10^{-7} i.u./ml can be maintained for as long as 20 min after its release.

TEXT-FIG. 1. The amounts of oxytocic activity in Mares 5 (---○), 1 (—○), 8 (—×) and 2 (—□) at indicated time intervals after the initiation of nursing.

TEXT-FIG. 2. The amounts of oxytocic activity in Mares 7 (○—○), 4 (×---×), 3 (□—□) and 6 (×—×) at indicated time intervals after the initiation of nursing.

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