

It may be seen from Fig. 2 that CPZ produces a classic phasic contracture of the skeletal muscle. The fact that it is not blocked by curare, a competitive blocker of the neuromuscular junction and CPZ itself produce a neuromuscular blocking action, shows that the drug produces contracture by acting at a receptor site other than the neuromuscular junction. The next alternative site of action would be the cell membrane or the contractile machinery. The addition of high concentration of potassium to the isolated muscle initiates the classic phase of potassium contracture, but it is not necessarily correlated with the contractility¹⁰. In potassium-free ringer CPZ produces contracture but relaxes quickly compared to the effect in normal ringer. Its failure to produce this effect in calcium-free ringer suggests that this action is mediated through potassium and calcium ions. CPZ is reported to be having a membrane stabilising action⁶, this demonstrates that the contracture is produced by stabilising the cell membrane, so as to rise the tissue concentration of potassium and calcium ions beyond physiological limits, and more so in a rise of potassium resulting in contracture.

Thus, CPZ is shown to have an anticholinergic action in low doses and a membrane stabilising action resulting in contracture of the skeletal muscle of frog in high dose.

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RADIOCARBON DATES OF SOME LATE QUATERNARY SAMPLES

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PRESENTED below are the ¹⁴C dates of Late Quaternary samples from the coastal and riverine sediments. The eustatic samples are derived from the western coast. Quite a few samples of miliolite formations of Gujarat have also been dated. The river sediments have been ¹⁴C dated for their Stone Age associations.

The samples have been counted in the form of methane in gas proportional counters. The techniques have been described in detail elsewhere (Agrawal and Kusumgar, 1965; Agrawal *et al.*, 1971; Kusumgar *et al.*, 1963). Ninetyfive per cent activity of N.B.S. oxalic acid has been used as a modern standard. For all samples two dates are given in B.P. The first is based on 5568 yr. half-life value and the second, in parenthesis, on 5730 yr. None of the dates has been calibrated for any ¹⁴C/¹²C variations. The dates can be converted to AD/BC scale by using 1950 AD as reference year,

Though CaCO₃ measurements too have been expressed in terms of ¹⁴C dates, yet it has to be noted that CaCO₃ is an inorganic chemical and the ¹⁴C method, strictly speaking, does not apply to it.

These measurements were made at the Tata Institute, Bombay, but now the C¹⁴ lab has been shifted to Physical Research Laboratory, Ahmedabad.

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Asla, Maharashtra India

TF-1178, Late Quaternary, 9750 ± 120
(10035 ± 125)

Shells from pebbly conglomerate 2.5 m above Krishna river bed at Asla (Lat. 17° 53' N., Long. 73° 59½' E.), District Satara.

Barda Hill, Gujarat, India

Miliolite limestone from a running quarry near Barda (Lat. 21° 35' N., Long. 69° 55' E.), District Porbandar.

TF-764 (a), Late Quaternary, 17915 ± 435
(18435 ± 445)

Whole sample was measured after repeatedly washing with 1 normal HCl.

TF-764 (b), Late Quaternary, 12990 ± 185
(13370 ± 190)

Oolite grain fraction ranging between 150 to 420 microns; washed repeatedly with 1 normal HCl.

Beli Iena athula, Ceylon

TF-1094, Prehistoric Cave, 7640 ± 110
(7860 ± 110)

Carbonised kernels collected at a depth of 45 m from a prehistoric cave (Lat. 6° 56' 5" N., Long. 80° 14' 5" E.), near Maniyangama, 4 km S.E. of Avisawella.

Cochin Harbour Area, Kerala, India

TF-1147, Late Quaternary, 8795 ± 115
(9050 ± 115)

Log of wood found at the depth of 21 m during well sinking from Cochin harbour area (Lat. 9° 57' N., Long. 76° 15' E.), District Ernakulam.

Continental shelf, West Coast, India

The samples were collected by dredging on the continental shelf.

TF-968, Late Quaternary, 8940 ± 130
(9200 ± 135)

Oolitic limestone from continental shelf off Bombay (Lat. 18° 36' N., Long. 70° 39' 4" E.), water depth 96 m., sample No. 42 (a).

TF-970, Late Quaternary, 10725 ± 400
(11035 ± 400)

Massive Oolitic limestone (carbonate) from continental shelf off Bombay (Lat. 19° 15' N., Long. 69° 45' E.), water depth 150 m., sample No. 2.

TF-1200, Late Quaternary, 10120 ± 250
(10415 ± 260)

Coral from continental shelf off Ratnagiri (Lat. 17° N., Long. 19° 30' E.), depth 165 m from sea surface. Sample No. 10.

TF-971, Late Quaternary, 11220 ± 130
(11550 ± 135)

Massive coral from continental shelf off Bombay (Lat. 19° 15' N., Long. 69° 45' E.), water depth 150 m. Sample No. E.

Deoghat, U.P., India

TF-1245, Late Quaternary, 19155 ± 330
(19715 ± 340)

Shells extracted from gravel III at Deoghat (Lat. 24° 54' N., Long. 82° 2' E.), on River Belan, District Allahabad.

Dhom Dam, Maharashtra, India

TF-1004, Late Quaternary,

$$38470 \begin{matrix} + 8940 \\ - 4125 \end{matrix} \quad \left(39590 \begin{matrix} + 9200 \\ - 4245 \end{matrix} \right)$$

Shells from lenticular body of pebble conglomerate, at a depth of 19 m from terrace surface on River Krishna near Dhom Dam (Lat. 17° 58' N., Long. 73° 52' E.), District Satara.

Dodo Hill, W. Rajasthan, India

TF-1215, Late Quaternary, 14080 ± 170
(14485 ± 170)

Calcium carbonate samples from the concretionary layer of rhyolite zone of weathering on the piedmont slope. Sample No. 9.

Gargaon, Maharashtra, India

TF-1111, Late Quaternary, 10020 ± 150
(10310 ± 155)

Calcified bones from the silt deposit, 12 m above water level and overlying the Middle Stone Age (M.S.A.) bearing gravel near Gargaon on River Mula. District Poona.

Inamgaon, Maharashtra, India

TF-1177, Late Quaternary, 18750 ± 350
(19290 ± 360)

Freshwater shells from M.S.A. tool bearing sandy pebbles conglomerate on River Ghod and 2 m above the river bed near Inamgaon (Lat. 18° 36' N., Long. 74° 32' E.), District Poona.

TF-1003, Late Quaternary,

$$21110 \begin{matrix} + 615 \\ - 570 \end{matrix} \quad \left(21725 \begin{matrix} + 630 \\ - 585 \end{matrix} \right)$$

Shells from the sandy pebble gravel, 2 m above Ghod river bed.

Khadir Island, Great Rann of Kutch, India

TF-837 (b), Late Quaternary, $> 36,000$
($> 37,000$)

Oyster shells collected 3 m above MSL from Khadir Island (Lat. 23° 52' 30" N., Long. 70° 27' 30" E.).

Kotia, Gujarat, India

TF-759, Late Quaternary, 7430 ± 130
(7645 ± 135)

Calcium carbonate samples from freshly explored section near Kotia (Lat. 21° 50' N., Long. 73° 15' E.).

Kulur, Mysore, India

TF-966, Late Quaternary,

$$37355 \begin{matrix} + 5980 \\ - 3390 \end{matrix} \quad \left(38445 \begin{matrix} + 6150 \\ - 3490 \end{matrix} \right)$$

Root of tree extracted at the depth of 14 to 17 m from Kulur (Gurpar) river (Lat. 12° 55' N., Long. 74° 50' E.), District Mangalore. Comment: NaOH pretreatment was given. Sample dates a river bed sedimentation.

Kutch Area, Gujarat, India

TF-892, Late Quaternary,

$$32530 \begin{smallmatrix} + 2710 \\ - 2025 \end{smallmatrix} \quad (33480 \begin{smallmatrix} + 2790 \\ - 2085 \end{smallmatrix})$$

Miliolite shells collected at a depth of 7.6 m from a limestone bed near Katral hill 13 km from Bhuj Mandvi Road, District Kutch (Field No. 11/92).

TF-893, Late Quaternary,

$$28595 \begin{smallmatrix} + 1600 \\ - 1345 \end{smallmatrix} \quad (29430 \begin{smallmatrix} + 1650 \\ - 1380 \end{smallmatrix})$$

Miliola tests from the surface exposure of the limestone bed at Katral hill, District Kutch. (Field No. 11/26).

TF-897, Late Quaternary, 12280 ± 165
(12640 ± 170)

Miliola tests collected from the surface exposure on Bhuj-Naliya road near Drubya hill, District Kutch (Field No. 11/78).

TF-898, Late Quaternary,

$$24760 \begin{smallmatrix} + 1000 \\ - 885 \end{smallmatrix} \quad (25480 \begin{smallmatrix} + 1025 \\ - 915 \end{smallmatrix})$$

Miliola tests from surface exposures on the north flank of Jura hill, District Kutch. (Field No. 11/61).

TF-889, Late Quaternary, 11130 ± 150
(11450 ± 155)

Miliolite samples collected at Washtana (Lat. $23^{\circ} 25' N.$, Long. $70^{\circ} 34' E.$), District Waga. (Field No. 11/132).

Nicora, Gujarat, India

Calcite samples collected from the right bank of river Narmada at Nicora (Lat. $21^{\circ} 46' N.$, Long. $73^{\circ} 7' E.$), District Broach.

TF-900, Late Quaternary, 16825 ± 225
(17315 ± 230).

Calcite sample No. 2.

TF-901, Late Quaternary, 17810 ± 290
(18330 ± 300).

Calcite sample No. 3.

Panambur, Mysore, India

TF-1089, Late Quaternary,

$$37375 \begin{smallmatrix} + 4960 \\ - 3100 \end{smallmatrix} \quad (38460 \begin{smallmatrix} + 5105 \\ - 3190 \end{smallmatrix})$$

Carbonised wood from ancient coastal sediments at a depth of 11.5 m to 12 m near Punalur Harbour area (Lat. $12^{\circ} 56' N.$, Long. $74^{\circ} 50' E.$), District South Kanara.

Patan, Gujarat, India

TF-1047, Late Quaternary, 19645 ± 315
(20215 ± 325)

Shells from a 50 m thick exposed bed near Patan, District Junagarh. Stratigraphy not clear. (Field No. LOC-7/6/1969).

Pokran, W. Rajasthan, India

TF-1214, Late Quaternary,

$$27875 \begin{smallmatrix} + 1985 \\ - 1605 \end{smallmatrix} \quad (28690 \begin{smallmatrix} + 2045 \\ - 1650 \end{smallmatrix})$$

Carbonate sample from concretionary layer about 1 m below aeolian sand, 15 km east of Pokran.

Rati Karar, M.P., India

TF-967, Late Quaternary

$$32750 \begin{smallmatrix} + 1770 \\ - 1580 \end{smallmatrix} \quad (33700 \begin{smallmatrix} + 1820 \\ - 1625 \end{smallmatrix})$$

Shells collected at a depth of 11 m from a M.S.A. tool bearing and Late Pleistocene fossiliferous sandy pebbly conglomerate on River Narmada near Rati Karar village, District Narsinghpur.

Tasgaon, Maharashtra, India

TF-1213, Late Quaternary, 3745 ± 105
(3855 ± 110)

Wood sample 10 m below terrace level on the left bank of River Krishna near Tasgaon (Lat. $17^{\circ} 2' 30'' N.$, Long. $74^{\circ} 39' E.$), District Sangli. The deposit also yielded late Pleistocene fauna.

Vembanad Lake, Kerala, India

Shells extracted from the bed of Vembanad Lake to study the rate of sedimentation.

TF-1090, 3625 ± 95 (3735 ± 100)

Shells 3.35 m below the present bed. Sample No. 1.

TF-1091, 3945 ± 140 (4060 ± 145)

Shells 1.82 m below the present bed. Sample No. 2.

Samples sent by : TF-1178, -764 (a), -764 (b) -1004, -1111, -1177, -1003, -967, -1213 by Deccan College, Poona ; TF-1094 by BSIP, Lucknow ; TF-1147 by Kerala Engineering Research Inst., Peechi ; TF-968, -970, -1200, -971, -1090, -1091 by NIO, Goa ; TF-1245 by Allahabad University, Allahabad ; TF-1215, -1214 by CAZRI, Jodhpur ; TF-837 (b), -892, -898, 889 by ONGC, Baroda ; TF-759, -900, -901 by M.S. University, Baroda ; TF-966, -1089 by Karnataka Regional College of Engineering, Surathkal ; TF-1047 by TIFR, Bombay.

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