Table 2. Field attractancy of male *Heliothis armigera* to synthetic compounds

Test*	Bait**	Mean No. of male catches per trap	Test*	Bait**	Mean No. of male catches per trap
1	5 mg (Z)-11-HDA	6		10 mg (Z)-9-TDA	0
	5 mg (Z)-11-TDA	3		5 mg (Z)-11-HDA + 5 mg (Z)-11-TDA	13
	5 mg (Z)-11-HDA + 5 mg (Z)-11-TDA	9		5 mg (Z)-11-HDA + 5 mg (Z)-9-TDA	0
	5 mg (Z)-11-HDA + 1 mg (Z)-9-TDA	2		Unbaited	0
	Unbaited	0	4	10 mg (Z)-11-HDA	3
2	10 mg (Z)-11-HDA	4		2 virgin females	2
	10 mg (Z)-11-TDA	12		Unbaited	0
	5 mg (Z)-11-HDA + 5 mg (Z)-11-TDA	11	5	10 mg (Z)-11-TDA	2
	Unbaited	0		2 virgin females	3
3	10 mg (Z)-11-HDA	21		Unbaited	0
	10 mg (Z)-11-TDA	7			

* Each test lasted 4 days; ** HDA-hexadecenal; TDA-tetradecenal.

response when combined at 1:10 ratio with one of the stimulatory compounds. This ratio of (Z)-9-TDA to (Z)-11-HDA was found by Roelofs et al.[6] to be the optimal combination for sexual excitation of *H. virescens.* The positive response of male *H. armigera* to (Z)-11-HDA and to (Z)-11-TDA was confirmed in field tests (table 2). The 2 compounds had approximately the same effect and their effect was similar to that of virgin females in attracting males. Combination of the 2 compounds at 1:1 ratio did not enhance attraction. (Z)-9-TDA was not effective and when combined with stimulatory compounds had an inhibitory effect on male catches. Since the natural pheromone of *H. armigera* is not yet known, we recommend the use of (Z)-11-HDA as a sex attractant in traps for monitoring populations of *H. armigera.*

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9 The tests were made at different locations, up to 40 km apart, and were run during the 1977 season (June, July). Population of *H. armigera* was especially low in that year.

Is chemical memory transfer due to shock or behavior training?

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Summary. A memory transfer experiment was performed to determine whether the transfer effect is due to stress associated with the foot shock or to the specific behavioral training. Recipient animals were significantly better in the 'jump-out' testing than either the shock-control recipients or the control recipients, but the shock-control recipients performed significantly better than the control recipients. Foot shock has an effect on the transfer phenomena but is not responsible for the entire effect.

A number of transfer experiments have been reported over the years[2]. There have been a number of criticisms of the transfer paradigm, specifically of Ungar's design[3-5]. Goldstein[3] suggests that the transfer effect is induced by exposure to shock or to an increased emotionality.

This experiment is designed to test whether transfer is due to shock[3] or due to a transfer of a behavior training[6,7]. We followed the guidelines set by Ungar[7,8] for the study of chemical transfer of learned information as closely as possible.

The subjects were 163 female C57BL/6J mice; 136 subjects were approximately 16 weeks old (donors) and 27 were approximately 12 weeks old (recipients). All subjects weighed between 20 and 30 g. The animals were housed 5 animals per cage and were kept on a light/dark 12 h cycle with ad lib food and water.

All animals were trained and tested in a 15 cm × 15 cm plexiglas shock box 10 cm deep. The shock box had a floor made of a grid of 1.6 mm stainless steel bars 10 mm apart. A flat piece of masonite extended 17.5 cm from the rim of the shock box on all sides and was enclosed by 40 cm high aluminium walls. A 3.6 cm band of 0.6-cm hardware cloth was placed around the rim of the shock box. The subjects could therefore either jump or climb out of the shock box into the safe area.

For donor no-escape control training a clear plexiglas top was placed over the shock box. Then, the subjects could not escape from the foot shock. The shock box floor was wired through a diode bridge connecting every 5th bar. During training, experimental donors and shock-control donors obtained the foot shocks of 180 μA.

Donor animals were trained to jump out of the box within 5 sec to escape electric shock. Each subject received 30 trials with a 30 sec intertrial interval for 6 consecutive days. The subjects were trained in 4 groups of 13 animals each. Any animals failing to meet 90% or more correct responses on the 6th training day were discarded. 42 donor no-escape control animals were given random electric shock which was not related to any response contingency. Each subject received an amount of shock that was equal to the average amount that the experimental animals obtained in each of 6 days of training.

42 other animals were used as a 2nd donor control group. They did not receive any shock or any special handling.

Recipient animals were randomly assigned to receive extracts from 1 of the 3 donor groups. For each group there was a total of 10 recipients, except for the no-escape control group which had 7 recipients. The recipients were tested without reinforcement at 24, 48, and 72-h intervals. Each test consisted of 30 trials with a 30 sec intertrial period in the jump-out box and the number of jump outs were scored. The scores were statistically compared using an analysis of variance with a t-test to see if any group performed better than any of the others. All recipients were injected with the equivalent of 4 donor brains. The recipients were tested under blind procedures. The donor animals were sacrificed by decapitation not more than 2 h after their last training session. The head was immediately placed into a freezer and kept at −40 °C until its entire group was done. The frozen brain was then removed and weighed. The frozen brains were combined with 10 ml of cold (+4 °C) double distilled deionized water for each g of brain weight, and homogenized (without thawing) using a teflon pestle for approximately 5 min (20 strokes). The homogenate was then placed in a refrigerated centrifuge and centrifuged at 10,000 × g for 1 h. All operations were carried out under temperatures between 0 and 4 °C. After centrifugation the supernatant fluid was poured off and evaporated under vacuum using a flash evaporator at 0-4 °C. After the supernatant was entirely dry it was stored in a refrigerator kept at 2 °C until it was time to inject and test the recipient animals. Enough cold physiological saline was added to the powder to make the equivalent of 4 donor brains in 0.5 cm^3 of final solution. This was the dose which each recipient animal received i.p. On the 6th day of training of the donor experimental group 10 animals had to be discarded because they had not reached the 90% criteria level.

An analysis of variance was performed on the data. The days interaction was not significant, but the groups interaction was significant ($F(2.79) = 13.744$, $p < 0.001$). A t-test was performed on the combined means for the 3 groups over the 3 days (table). The experimental group made significantly more jump outs than either the no-escape control or control group: $t(79) = 3.02$, $p < 0.01$ and $t(79) = 5.57$, $p < 0.001$, respectively. There was also a significant difference between the jump out scores of the control and no-escape control group. The no-escape control group made significantly more jumps than the control group, $t(79) = 2.04$, $p < 0.05$. Thus, in the testing trials, the recipients injected with the brain extracts of the trained donors exhibited significantly more escapes than both control groups. These results indicate a positive transfer effect. Injections from donors which received only foot shock influenced also the behavior of the recipients, but the number of avoidance responses in this group was in between the responses of mice which received extracts from either naive or fully trained brains.

Group	Mean	df	t	p
Experimental	9.367	79	3.02	< 0.01
Shock control	4.571			
Experimental	9.367	79	5.57	< 0.001
Control	1.333			
Shock control	4.571	79	2.04	< 0.05
Control	1.333			

This experiment indicates that the positive transfer effect is not due to the stress of the trained donors only. If it were so, the transfer effect caused by the extract from trained and no-escape trained brain would be the same.

There are however at least 2 possible explanations of the difference. There might be a quantitative difference in the amount of the active substance in the brain of a trained and a no-escape donor. This causes that the recipients of the no-escape extract escape less often. Another possibility is that we are dealing with 2 different training situations, and therefore with 2 different transfer substances. The no-escape animals learn that they get a painful stimulation in the apparatus; however, they do not learn a proper response, the escape. The recipients react accordingly, but less often than the recipients of an extract of a fully trained brain.

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Inter omental-cerebral vascularization induced by omental graft to the rat brain[1]

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Summary. The omentum of 13 rats were removed from the abdomen and placed directly on the brain. 5-14 days later the omentum and the underlying brain were joined by numerous vascular anastomoses in 9 rats. The purpose of this work was to study the use of omentum to establish extracranial vascularization of the brain.

The omentum stimulates neovascularization when joined to other tissues or organs by trauma, infection or surgery[2-7]. This response has been used by surgeons to channel new supplies of blood to a vascular tissues[3-5]. This is done by opening the abdomen, elongating the omentum, taking care that the vascular attachments to the abdominal arteries are kept intact. The elongated intact omentum is taken out of the abdominal cavity, inserted beneath the skin all the way to its eventual destination - the leg, brain, arm or wherever. After trepanation, it is placed directly onto the surface of the brain. It has been assumed, that blood flows from the omentum to the brain because omental transposition has prevented cerebral infarction following middle cerebral artery occlusion in dogs[4] and monkeys[5]. Blood flow studies have not been done. Another method has been to remove a piece of omentum, separate it from the abdominal cavity