Chapter 8

SUMMARY AND CONCLUSIONS
1. Six herbal formulations, marketed in India for memory enhancing effects, were subjected to tests for nootropic activity in Wistar rats and Swiss mice. The parameters of study included active avoidance learning in young and old rats, passive avoidance learning in normal mice and also in scopolamine and ECS-amnesic mice, transfer latency in mice using elevated plus maze, and food and thirst motivation behaviour in rats using Hebb William Maze and Anxiometer. All of the test drugs viz. Ayurvedic Syrup Shankpushpi, Vidyarthi Amrit, Saraswatarisht and Dinagh Poushtak Rasayan and Unani Rogan Badam Shirin and Dimagheen exhibited cognition facilitatory effects in varied experimental models. Though animal models, using principles of reward and punishment, have several limitations of predictability for human learning and memory, the findings were very encouraging.

2. With the sole exception of Roghan Badam Shirin derived from single plant ingredient Prunus amygdalis, all of the test drugs are polyherbal formulations containing 4 to 19 medicinal plants. No studies are available on these formulations for comparison, but many of plant ingredients particularly Centella asiatica, Convolvulus pluricaulis, Withania somnifera etc. possess well documented relevant CNS properties (nootropic, tranquillizing, adaptogenic, antistress and anxiolytic effects) justifying their incorporation in formulations intended for enhancing memory.

3. Human learning and memory processes are quite complex and no single mechanism of action for a nootropic agent can adequately explain the observed effects. This is particularly true when the drugs, under study, are multi-ingredient. Polypharmacy in Ayurveda and Unani Tibb is the rule and it is
believed that the components act in synergism and correct the side effects of each other. Preliminary neurotransmitter studies for effects on brain ACh-E, L-glutamate, L-aspartate and GABA, revealed evidence for cholinergic activity elicited by the formulations as a possible mechanism involved. Participation of other mechanisms and neurotransmitters, however, can not be ruled out by present findings.

4. It is concluded that while the test drugs, under study, exhibited encouraging nootropic activity with adequate safety, no final statement can be made at this stage regarding their mechanism(s) of action. Further experimental and clinical investigations are warranted to establish scientific basis for their claimed therapeutic utility in human beings as also for the mechanisms involved.