Introduction
Psychostimulants increase blood brain barrier (BBB) permeability to peripheral toxins and pathogens. Increased BBB permeability is associated with neurodegenerative changes and central nervous system disease. Amphetamine, methamphetamine and cocaine increase BBB permeability, the mechanisms being inducing cerebral hyperthermia, oxidative stress, and increased cerebral blood pressure. In HIV infected persons, methamphetamine or cocaine use worsens neurodegenerative changes. Cathine and cathinone, active chemicals in khat, are structurally related to amphetamine; however, their effect on BBB permeability is not known. Therefore, in this study, we examined the effect of a binge-dose pattern of khat on BBB integrity using Evans Blue and Trypan Blue dyes.

Materials and methods
In this experimental study, thirty six-weeks, 76–44g rats (female) were used. In the first experiment, 3 rats (female = 6; male = 2) were given 4 subcutaneous injections of saline or khat extract (180mg/kg, 360mg/kg or 720mg/kg) at 2 hour intervals (binge-dose pattern). Then Evans Blue dye was injected either before or at various intervals after the khat treatment. The brain tissue was harvested and examined qualitatively by visual inspection for dye staining. In the second experiment, 21 female rats were divided into 4 groups (3 khat treated and 1 control group) and the concentration of Evans Blue dye in the brain tissue measured spectrophotometrically. In the third experiment, 4 female rats were injected with Trypan Blue dye following the binge-dose pattern of khat extract administration. Rectal temperatures were measured during all the experiments as a measure of the khat effect as khat causes hyperthermia.

Results
In both control and khat treated rats, Evans Blue or Trypan Blue dye staining was only observed in brain regions outside the BBB, namely, pial vessels, choroid plexus, hypothalamus, and midbrain regions. Spectrophotometric analysis of Evans Blue dye concentration in brain tissue showed no statistically significant difference between the control and experimental groups.

Conclusion
The results show that binge-dose pattern of *Catha edulis* extract administration does not cause gross changes in BBB permeability. Possible explanations include less intense oxidative stress, lower grade cerebral hyperthermia or less severe intracerebral hypertension when compared to the amphetamines and cocaine. There is a possibility that a minor breach occurred which requires a more sensitive technique to detect it.

Literature cited

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University of Nairobi, College of Health Sciences, Department of Medical Physiology and Department of Biochemistry laboratory staff.

*Further information: geraldongayo@yahoo.com*