

Emissary venous flow and selective brain cooling in hyperthermic human subjects.

メタデータ	言語: jpn 出版者: 公開日: 2022-10-27 キーワード (Ja): キーワード (En): 作成者: Nagasaka, Tetsuo メールアドレス: 所属:
URL	https://doi.org/10.24517/00067309

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1992 Fiscal Year Final Research Report Summary

Emissary venous flow and selective brain cooling in hyperthermic human subjects.

Research Project

Project/Area Number

02454128

Research Category

Grant-in-Aid for General Scientific Research (B)

Allocation Type

Single-year Grants

Research Field

環境生理学(含体力医学・栄養生理学)

Research Institution

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Project Period (FY)

1990 - 1992

Keywords

Hyperthermia / Passive Body Warming / Exercise / Selective brain Cooling / Emissary veins / Sweating / Body Posture Change

Research Abstract

We measured skin blood flow and sweating rate of the head, blood flow in the angular oculi and mastoid emissary veins, esophageal, tympanic, and mean skin temperatures during whole body hyperthermia in male volunteers. 1. When angular oculi flow was obstructed for 8-10 min while core temperatures were still rising, the rate of rise in tympanic temperature increased than before but that in esophageal temperature did not change. When angular oculi flow was increased by skin compression over the facial veins at an alinasl level, the rate of rise in tympanic temperature decreased than before but esophageal

temperature did not change. 2. Tympanic temperature at which a sharp increase of flow occurred in angular oculi veins was the same in either passive body warming or exercise. 3. Temperature difference between the esophagus and the tympanum [Tes-Tty] became less in the subjects with heavy make-up than in those without. 4. When body posture was changed from supine to a 30° head-up position, blood flows in angular oculi and mastoid emissary veins were increased with a fall in the rate of rise in tympanic temperature. When the subjects remained supine, [Tes-Tty] remained small for the entire period of whole body hyperthermia. 5. During body warming, mean skin temperature reached 37-38°C and skin blood flow and sweating rate of the face reached a plateau even when core temperatures were still rising. We suggest that the fall in brain temperature by selective brain cooling would not suppress the heat loss responses as far as brain temperature is within the range of temperature at which the heat loss responses are at their maximum level. From these results, we conclude that selective brain cooling is possible and important in humans. Selective brain cooling is achieved by inflow of venous blood, cooled on the scalp and face by evaporation of sweat, through the emissary and ophthalmic veins into the intracranium.

Research Products (23 results)

	All	Other
	All Publications (23 results)	
[Publications] Nagasaka,T.et al.: "Role of the veins of the face in brain cooling during body arming in human subjects." Jpn.J.Biometeor.27(3). 113-120 (1990)		▼
[Publications] Hirashita.M.et al.: "Blood flow through the ophthalmic veins during exercise in humans." Eur.J.Appl.Physiol.64. 92-97 (1992)		▼
[Publications] 平井 敦夫: "無風高温環境で頭部の熱移動におよぼす化粧の影響。" 宇宙航空環境医学. 30. (1993)		▼
[Publications] Brinnel.H. et al.: "The efficiency of selective brain cooling during hyperthermia in humans in upright versus supine position." Strahlenther.Onkol.166. 508 (1990)		▼
[Publications] 平下 政美: "ヒトの暑熱障害防止を目的とした選択的脳冷却機構の個人差の解明。" デサントスポーツ科学. 14. (1993)		▼
[Publications] Nagasaka,T.: "Letters to the editors:Influence of ventilation of the face on thermoregulation in man during hyper-and hypothermia." Eru.J.Appl.Physiol.64. 280 (1992)		▼
[Publications] Hirashita,M.et al.: "Contributions of body core and mean skin temperatures to the control of forehead sweating rate in humans." Jpn.J.Bimeteor.30. (1993)		▼
[Publications] Hirashita,M.et al.: "Relationship between heat loss responses and body core temperatures during hyperthermia in humans." Jpn.J.Biometeor.30. (1993)		▼
[Publications] Hirai,A.et al.: "Enhancement of finger blood flow response of postprandial human subjects to the increase in body temperature during exercise." Eur.J.Appl.Physiol.62. 221-227 (1991)		▼
[Publications] 永坂 鉄夫: "温熱と疲労の応用生理。" 疲労と栄養の科学. 7(1). 1-4 (1992)		▼
[Publications] 永坂 鉄夫: "ハイパーサーミアその生理と病態一。" 日温気物医誌. 55(1). 13-15 (1991)		▼
[Publications] Nagasaka.T.et al.: "Heat-induced finger vasoconstriction controlled by skin sympathetic nerve activity." J.Appl.Physiol.68. 71-75 (1990)		▼
[Publications] 永坂 鉄夫: "動静脈吻合による皮膚での熱移動の調節。" 日本生理誌. 52. 197-205 (1990)		▼
[Publications] Nagasaka.T.: "Heat-induced skin vasoconstriction-A mechanism to retard heat gain through skin heated locally in hot environments." Environmental Med.34. 37-44 (1990)		▼
[Publications] Nagasaka,T. et al.: "Role of the veins of the face in brain cooling during body warming in human subjects." Jpn. J. Biometeor.27(3). 113-120 (1990)		▼
[Publications] Hirashita,M. et al.: "Blood flow through the ophthalmic veins during exercise in humans." Eur. J. Appl. Physiol.64. 92-97 (1992)		▼
[Publications] Brinnel,H. et al.: "The efficiency of selective brain cooling during hyperthermia in humans in upright versus supine position." Strahlenther. Onkol.166. 508 (1990)		▼

[Publications] T.Nagasaka: "Letters to the editors: Influence of ventilation of the face on thermoregulation in man during hyper- and hypothermia." Eur. J. Appl. Physiol.64. 280 (1992) ▼

[Publications] Hirashita,M. et al.: "Relationship between heat loss responses and body core temperatures during hyperthermia in humans." Jpn. J. Biometeor.30. (1993) ▼

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URL: https://kaken.nii.ac.jp/report/KAKENHI-PROJECT-02454128/024541281992kenkyu_seika_hokoku_

Published: 1994-03-23