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Review Article

PYREXIA: PATHOPHYSIOLOGY AND USE OF HERBAL DRUGS

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ABSTRACT

Fever is defined as a increase in body temperature (>99°C) due to derangemnet of heat mechanism in brain which is known as temperature set point. Fever can be caused by virus, bacteria, microorganism which produce pyrogen. In fever blood pressure, pulse rate, cardiac output, respiration is increase. Anti-pyretic words derived from two word Anti- against & Pyretic- Pertaining to fever. Fever can be treated by traditional drugs. A variety of ethanomedical plants are available in India which are used as antipyretic such as bhringraj, tulsi, liquorice, shatavri, black papper, menthol, kantkari, chirata, barberry etc. In this review we explain how these plants are effective to cure fever has been study in various labs. We also explain which solvents are used to obtain the main constituents which is used as a antipyretic.

Keywords: Pyrexia, Antipyretic drugs, Pyrogen, TNF- α

INTRODUCTION

Pyrexia or fever is caused as a secondary impact of infection, tissue damage, inflammation, graft rejection, malignancy or other diseased states.[1] Normally the infected or damaged tissue initiates the enhanced formation of proinflammatory mediators (cytokines, such as interleukin 1β, α, β, and TNF- α), which increase the synthesis of prostaglandin E2 (PGE_2) near hypothalamic area and thereby trigger the hypothalamus to elevate the body temperature.[2] Fever, also known as a febrile response or pyrexia, is an elevated temperature defined by an early morning temperature greater than 37.2°C or an evening temperature over 37.7°C. It is one of the oldest and most well-understood hallmarks of disease.[3] Normal body temperature is regulated by centers in the hypothalamus that ensures balance between heat loss and heat gain. Fever occurs where there is a disturbance of this hypothalamic "thermostat".[4] fevers are often a presenting symptom of a self-limiting viral infection, they are also associated with serious bacterial infections, such as meningitis and pneumonia, and other non-infective illnesses. Therefore, the underlying illness causing the fever needs to be determined.[5] The initial management of fever includes treatment of the cause and the administration of antipyretic (fever-lowering) drugs. Antipyretic treatments are effective in lowering temperature, but can have important side effects.[6]

PATHOGENESIS OF FEVER

Pyrogen refers to any substance which causes fever, and is divided into two classes · The first type of pyrogens are those derived from outside the patient, termed "exogenous pyrogens". These mostly encompass microbial products, toxins, or the pathogenic microorganism itself . he second class of pyrogens are 'endogenous', meaning they are produced 'within' the patient. They tend to be cytokines (small proteins which regulate immune, inflammatory, and haematopoietic processes), and are named pyrogenic cytokines if they evoke the febrile response .[7] Pyrogenic cytokines, such as interleukin-1 b(IL-1b), tumor necrosis factor (TNF), and interleukin-6(IL-6), are those that act directly on the hypothalamus (Figure 1) to effect a fever response.[8] The circumventricular organ system (CVOS) has many receptors for endogenous cytokines, especially IL-1 and TNF, and has a key role in inducing prostaglandin synthesis. They are derived from arachidonic acid via the cyclooxygenase dependent pathway, and have diverse physiological functions, such as regulation of blood flow and modulation of synaptic transmissions.[9] In the febrile response, the main prostaglandin produced is prostaglandin E_2 (PGE_2).[10]

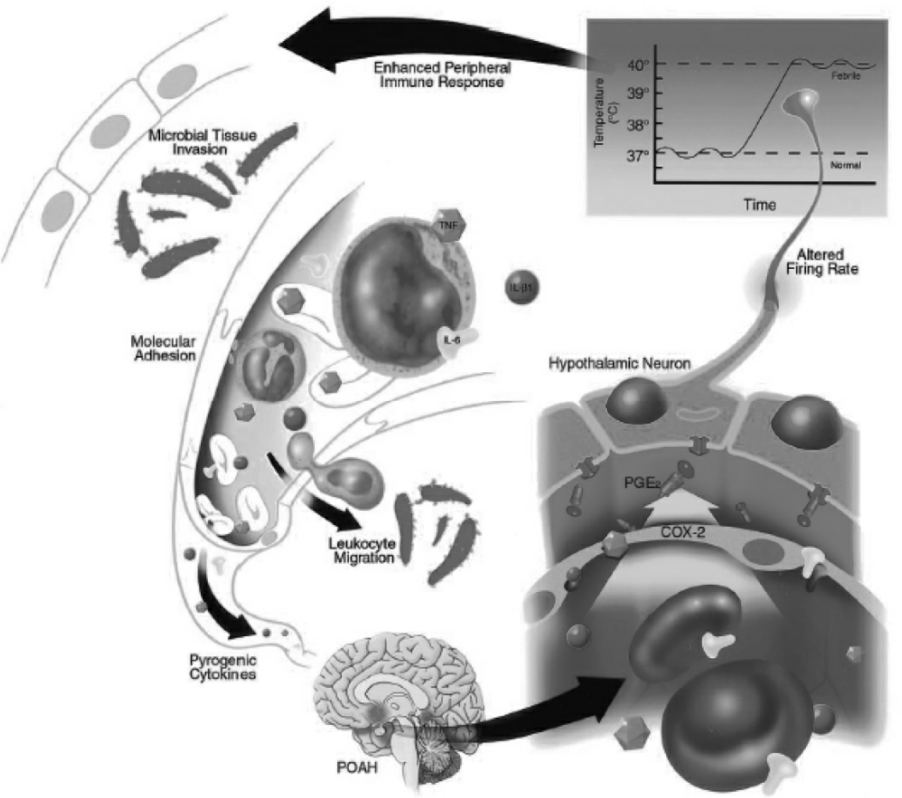

Figure 1: **Fever generation after infection**.[1]

PATHOPHSIOLOGY OF FEVER

Fever is a coordinated neuroendocrine, autonomic andbehavioural response that is adaptive, and an essentialpart of the acute-phase response to immune stimulus or tissue injury.[11] It should be emphasized that fever is not an illness but is, infact, a physiologic mechanism that has beneficial effects in fighting infection**.** Fever retards the growth and reproduction of bacteria and viruses, enhances neutrophil production and T-lymphocyte proliferation, and aids in the body's acute phase reaction**.**[12]

The Thermoregulatory **(**Figure 2**)** center is located in the anterior portion of the hypothalamus**.** That balance heat production with heat loss**.** Integral to the process are the heat sensitive receptors located in the preoptic area of the anterior hypothalamus**.**[13] When fever occurs, many physiological stresses take place**.** Some of these include increased oxygen consumption as a response to increased cell metabolism, increased heart rate, increased cardiac output, increased leukocyte count, and an increased level of C-reactive protein**.** Oxygen consumption increases by 13% for every 1°C increase in body temperature, provided no shivering occurs**.**[14]

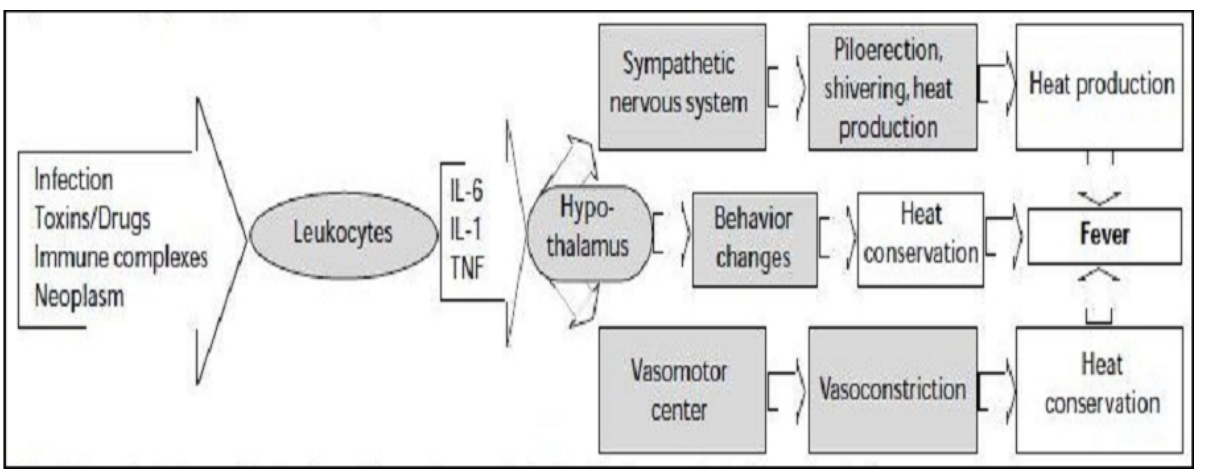

Figure 2: Pathophysiology of fever[15]

HERBAL DRUGS

Common name	Botanical Name	Part used	Family	Extract Used	Ref
Shatavari	*Asparagus racemosus*	Fleshy roots	Liliaceae	Alcohol	16,17,18
Liquorice	*Glycyrrhiza glabra*	Root	Leguminosae	Methanol & petroleum ether	19
Ashwagandha	*Withania somnifera,*	Roots and leaves	Solanaceae	Methanol, aqueous	19
Ginger Adrak	*Zingiberofficinale*	Fleshy Leaves of Bulb	Zingiberaceae	100% ethanol & Methanol	20,21
Nirgundi	*Vitex negundo*	Shrub	Verbenaceae	Methanol & petroleum ether	22,23,24
Chandan	*Chenopodium album*	Fruit	Chinopodiaceae	Ethanol	25
Chandan	*Chenopodium ambrosioides*	Leaf	Chinopodiaceae	Methanol	25
Guduchi	*Tinospora cordifolia*	Stem, root, leaves	Menispermaceae	95% ethanol	26,27,28
Tulsi	*Osmium sanctum*	Leaves	Labiatae	Methanol	29
Coat buttons	*Tridax procumbens (L.)*	Whole plant	Compositae	Ethanol & ethyl acetate	30,31
Black paper	*Piper nigrum L.*	Dried fruit	Piperaceae	Alcohol	32,33
Janglianar	*Dodonaea viscose Linn.*	Seeds	Sapindaceae	Ethanol	34
Menthol	*Mentha longifolia l.*	Leaves	Lamiaceae	Aqueous	35
Mistletoes	*Loranthusregularissteud.ex*	Whole plant	Loranthaceae	Methanol	36
God's tree	*Alstonia boonei* De	Stem bark	Apocynaceae	Methanol	37,38
Parwal	*Trichosanthes dioica*	Leaves	Cucurbitaceae	Methanol	39,40
Amla,	*Emblica officinalis Gaertn*	Fruits	Euphorbiaceae	Ethanol, aqueous	41,42
Common fig	*Ficus carica L.*	Leavesfruit	Moraceae	90% ethanol	43
Peppal	*Ficus religiosa*	Stem bark	Moraceae	Water, chloroform & ether	44
Brahmi	*Bacopa monniera*	Leaves	Scrophulariaceae	Water, hexan, methanol & Petroleum Ether	45,46,47
Kachnal	*Bauhinia racemosa Linn.*	Stem bark	caesalpiniaceae	Methanol	48,49
Sarivan,	*Desmodium gangeticum*	Root,whole plant	Papilionaceae(Fabaceae)	Petroleum ether	50
Haldi	*Curcuma longa Linn.*	Rhizomes	Zingiberceae	Methanol	51,52
Tropical Fanleaf	*Fioria vitifolia Linn.,*	Whole plant	Malvacae	Methanol	53
Putranjiva	*Putranjiva roxburghii*	Leaves	Putranjivaceae	Ether	54
Swallow root, maredu gaddalu	*Decalepis hamiltonii*	Root	Periplocaceae	Methanol	55
Neem	*Azadirachta indica*	Leaves	Meliaceae	Methanol	56, 57
Mundi	*Sphaeranthus indicus* Linn.	Whole plant, seeds, flowers and roots.	Asteraceae	Petroleum ether, benzene, chloroform, ethanol	58,59
Kiryat	*Andrographis paniculata*	Leaves and stems	Acantheceae	Ethanol	60
Toothbrush tree, chota pilu	*Salvadora persica L*	Wood sticks	Salvadoraceae	Aqueous	61
White Thorn	*Acacia suma*	Stem bark	Fabaceae	Petroleum ether	62
Tinda parvel	*Coccinia grandis*	Fruit	Cucurbitaceae	Methanol	63
Bamboo	*Bambusa arundinacea*	Leaf, root, shoot and seed	Graminae	50% ethanol	64
Daru haldhi and chitra	*Berberis aristata DC.*	Root	Berberidaceae	Alcohol & aqueous	65,66
Golden shower	*Cassia fistula Linn*	Seed	Caesalpinioideae	Methanol	67
Three-seeded mercury	*Acalypha indica L*	Leaves, Root bark	Euphorbiaceae	Methanol	68
Kokilaksha	*Astercanthus longifolia*	Leaves	acanthaceae	Petroleum ether, benzene, chloroform, ethanol	69
Lepouo	*Mollugo pentaphylla Linn.*	Whole plant	Aizoaceae	Methanol	70, 71
Toothache plant	*Spilanthes acmella*	Leaves & flower	Compositae or Asteraceae	Water	72,73
Mangrove plant	*Pongamiapinnata(L.)Pierre*	Leaf	Fabaceae	70% ethanol	74
Candlenut	*Aleurites moluccana*	Leaf	Euphorbiaceae	Methanol	75
Bitter leaf	*Vernonia cinerea*	Stem bark &leaves	Asteraceae	Methanol	76
Imli	*Tamarindus indicia L.*	Pulp	Caesalpiniaceae	Aqueous	77,78

Himalayanyew	*Taxuswallichianazucc.*	Leaves	Taxaceae	Methanol	79
Cassava	*Manihot esculentacrantzis*	Leaves	phorbiaceae	Ethanol	80
Mithipatti & bana dhania,godha tulsi	*Scoparia dulcis linn.*	Aerial part,leaf , root &whole plant	Scrophulariaceae	Ethanol	81
Thuja	*Platycladus orieantalis*	Leaves	Cupressaceae	Petroleum ether	82
Feiyangcao	*Euphorbia hirta*	Leaves	Euphorbiaceae	Aqueous	83
Crown flower	*Calotropis gigantean*	Roots	Asclepiadaceae	Methanol	84
Rosary pea	*Abrus precatorius linn*	Seeds	Fabaeae	Ethanol	85
Annatto tree	*Tecomaria capensis*	Leaves	Bignoniaceae	Methanol	86
Kantkari	*Solanum xanthocarpum*	Whole plant	Solanaceae	Aquous	87
Chirata	*Sweretia chirata*	Leaves	Gentinaceae	Aqueous	87,88
Barberry	*Berberis lycium Royle*	Roots	Berberidaceae	Ethanol	89,90
	Grewia crenata	Leaves	Malvaceae	50% v/vmethanol	91
Witch weed	*Striga hermontheca (Del.) Benth.*	Leaves	Scrophulariaceae	50% v/v Methanol	91
Bush buck	*Gongronema latifolium Benth Hook,*	Leaves	Asclepiadaceae	50% v/v methanol	91
Kamal, lotus	*Nelumbo nucifera Gaertn.*	Rhizomes	Nymphaeceae	Ethanol	92,93
Karambha	*Capparis zeylanica Linn.*	Whole plant	Capparaceae	Methanol	94
Mahamundi	*Sphaeranthus indicus Linn.*	Whole plant	Compositae	Petroleum Ether, Benzen, Chloroform & ethanol.	95
Lov-vine	*Cassytha filiformis*	Leaves	Lauraceae	Ethanol	96
Morning mallow	*Sida acuta*	Leaf	Malvaceae	Petroleum ether,acetone & ethanol	97
Phakphet	*Spilanthes paniculata*	Leaves	Asteraceae	Ethanol,n-hexane,ethyl acetate	98
Akarkara	*Spilanthes acmella Murr*	Whole plant	Compositae	Aqueous	99
Pergularia	*Pergularia daemia*	Stem & leaves	Asclepiada cea	Petroleum ether	100
Bone setter	*Cissus quadrangularis*	Whole plant	Vitaceae	Ethanol	101
Bitter gourd	*Momordica charantia Linn.*	Fruit	Cucurbitaceae	Ethanol	102
Kpohoun	*Caesalpinia bonduc (L.) Roxb.*	Leaf	Caesalpiniaceae	Methanol	103
Black nightshade	*Solanum nigrum*	Leaves	Solansaceae	Chloroform	105, 104
Shisham	*Dalbergia sissoo*	Leaves	Fabaceae	90% ethanol	106
Keukand	*Costus speciosus Koen*	Aerial PART	Costaceae	Methanol	40
Parwal	*Trichosanthes dioica Roxb.*	Fruits	Cucurbitaceae	Methanol	42
Fig	*Ficus carica Linn.*	Leaves	Moraceae.	90% ethanol	107
Byakur, guta begun,	*Solanum indicumlinn.*	Fruits	Solanaceae	Petroleum ether, methanol	108
Vizhudh	*Cadaba trifoliata (Roxb.)*	Leaves	Capparaceae	Absolute alcohol	109
Amargandha	*Curcuma amada*	Rhizome	Zingiberaceae	Ethanol	110
Amarabela	*Cuscuta reflexa Roxb.*	Entire plat	Cuscutaceae	95 % v/v ethanol	111
Adavi benda	*Fioria vitifolia Linn*	Whole plant	Malvacae	Methanol	112
Carpet weed	*Mollugo pentaphylla Linn.*	Aerial part	Aizoaceae	Petroleum ether & ethanol	113
Palas	*Butea monosperma (Lam)*	Leaves stem bark, flowers and root	Fabaceae	Petroleum ether & ethanol	114
Sa-kan	*Piper interruptum Opiz.*	Stem	Piperaceae	95%ethanol	44
Di-pli	*Piper chaba Linn.*	Fruit	Piperaceae	95%ethanol	44
Anaikurumthotti	*Sida rhomboidea*	Roots	Malvacae	Alcohol	115
Kurunthotti	*Sida alnifolia*	Roots	Malvacae	Alcohol	115

CONCLUSION

Although herbal medicine has great importance than the allopathic drug but it's become necsarry to approved them. Evaluation of Indian tradit ional medicine is possible through the proper exploitation of wide biodiversity and great ancient treatise with light of modern tools & technique. In this review articles many herbal medicine are discuss which extracts show antipyretic properties in animal models.

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