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Global Climate Change and Weakened Therapeutic Agents against Ischaemic Heart Diseases

Dear Sir,

During the early 1990s, ischaemic heart diseases were responsible for more than 4 million deaths globally and ranked foremost as the global disease killers [1]. The impending global climate change with high temperature and raised water vapour [2] would blunt the efficacy of therapeutic intervention universally.

The therapeutic agents offered to patients afflicted with an ischaemic heart disease (table 1) are recommended for constant storage at 2–8 or 8–15 °C [3] or in a controlled room temperature not exceeding 25 or 30 °C [4]. Any inadvertent exposure of such therapeutic agents to a higher temperature for different durations would reduce

their potency and render them partly effective or even ineffective for treatment of acute and chronic events associated with ischaemic heart disease.

Heat waves are associated with high mortality. During the 1995 heat wave of Chicago, the heat-related mortality was accompanied by the maximum atmospheric tempera-

Table 1. Recommended temperatures to storage of therapeutic agents against cardiac disorders

Controlled temperature of 16–25 °C (or 30 °C)		
2–8 °C		
Glycosides	α -adrenoceptor blocking agents	tetrazosin ^a
Deslanoside	angiotensin II receptor (type AT ₁) antagonist	losartan
Lantoside-C	angiotensin-converting enzyme inhibitors	fasinopril ^a
Thrombolytic agents	angicoagulant	heparin ⁺
Alteplase	anti-arrhythmic agents	
Streptokinase	I, IA moricizine, procainamide, quinoline	
	IB lignocaine	
	II Bertyllium	
	III amiodarone, ibutilide fumarate	
	IV verapamil	
8–15 °C	anti-lipaeamic agents	
	bile acid sequestrant	gemfibrozil
	fibric acid derivative	clofibrate
	HMG-CoA reduction inhibitor	lovastatin
Glycosides	β -blockers	propranolol ^a
Digitoxin	calcium channel blockers	nifedipine ^a
	glycosides	digoxin
Vasodilators	other inotropic agents	
Isosorbine dinitrate	phosphodiesterase inhibitor	amrinone
Nitroglycerine	vasodilators	pentaerythritol tetranitrate ^a
^a And others.		

ture of 40°C, but the heat index, an estimate of evaporative and radiative transfer of heat from the atmosphere, had reached 48.3°C [5]. In developing countries, apart from heat-related mortality, higher power demands far exceed the electricity supply [6] during heat waves. Such additional electricity demands for an effective air-conditioning of hospital wards and shelters for the elderly [5] would leave the refrigeration inside refrigerators or cold storage appliances designed to store ischaemic disease therapeutics between 2 and 15°C (table 1) in shamble.

Future therapeutics against ischaemic heart diseases (table 1) should be stabilised to resist accidental exposures to adverse temperature or humidity hikes. Similar efforts

with labile vaccines by addition of trehalose, deuterium oxide, pirodavis or compounds based on multiple electrostatic interactions [7], have indeed been effective towards stabilisation against higher temperatures. Furthermore, it would be worthwhile insisting on distinctive marks on therapeutic formulations, on vials, tablets and infusions, indicating the exact storage temperature. Similar symbols have been mandatory for inflammables, radioactive substances or poisons.

Certainly, well-stabilised therapeutic agents with distinct indications for storage conditions would be effective to tackle ischaemic heart disease in the face of global climate warming and accompanying electricity shortages.

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References

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