

## B. 22 Intravenous fluids

### a. Describe the composition, pH and osmolality of crystalloids and colloids used in clinical practice.

#### 0.9% NaCl

Na <sup>+</sup>	150 mmol/l
Cl <sup>-</sup>	150 mmol/l
	300 mOsm/l
pH	4-7

#### Hartmann's solution

Na <sup>+</sup>	129 mmol/l
K <sup>+</sup>	5 mmol/l
Cl <sup>-</sup>	109 mmol/l
Ca <sup>2+</sup>	2 mmol/l
lactate	29 mmol/l
	274 mOsm/l
pH	5-7

#### 5% dextrose

glucose	278 mmol/l
	278 mOsm/l
pH	3.5-6.5

#### 4% dextrose 1/5 normal saline

Na <sup>+</sup>	30 mmol/l
Cl <sup>-</sup>	30 mmol/l
glucose	222 mmol/l
	282 mOsm/l
pH	3.5-6.5

#### mannitol

12.5%, 20% and 25% solutions

#### dextrans

40 and 70 in 5% glucose or 0.9% NaCl

#### polygeline (Haemaccel™)

Na <sup>+</sup>	145 mmol/l
K <sup>+</sup>	5.1 mmol/l
Cl <sup>-</sup>	145 mmol/l
Ca <sup>2+</sup>	6.25 mmol/l
PO <sub>4</sub> <sup>3-</sup> , SO <sub>4</sub> <sup>2-</sup>	trace
polygeline	35 g/l
	293 mOsm/l
pH	7.3±0.3

#### succinylated gelatin (Gelofusine™)

Na <sup>+</sup>	154 mmol/l
Cl <sup>-</sup>	120 mmol/l
Ca <sup>2+</sup>	<0.04 mmol/l
gelatin	40 g/l
	274 mOsm/l
pH	7.4±0.3

#### hetastarch

#### Albumex 4

Na <sup>+</sup>	140 mmol/l
Cl <sup>-</sup>	128 mmol/l
octanoate	6.4 mmol/l
albumin	40 g/l
	260 mOsm/l
pH	7±0.3

#### Packed red blood cells (300 ml)

erythrocytes	200 ml
albumin	4 g
globulin	2 g
total protein	36 g
Na <sup>+</sup>	15 mmol
K <sup>+</sup>	4 mmol (≈40 mmol/l)

other blood products in [Haematology \(1.J\)](#)

### b. Evaluate their effects and fate when used in volume replacement.

### c. Compare the pharmacology of colloids with crystalloids.

#### crystalloids

t<sub>1/2</sub> 20 min

free water (dextrose solution)

55% ICF, 38% ISF, 7% plasma

↓ total body tonicity (↓ [Na<sup>+</sup>]<sub>pl</sub>)

isotonic solutions

85% ISF, 15% plasma

#### colloids

remain in circulating compartment

	$t^{1/2}$ circ.	$t^{1/2}\beta$
polygeline	1-2 h	?4-6 h
Gelofusine	2-3 h	
dextran 40	4-6 h	2-6 h
dextran 70	12 h	12 h
Albumex 5	24 h	21 d
hetastarch	36 h	36 d

increased incidence of hypersensitivity (>1/10,000)