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Table S1. The main clinical drugs and their mode of action in the treatment of obesity.

Drug	Classification	Mechanism	Side Effects
Amphetamine (delisted)	Amphetamines	Releasing monoamine and inhibiting monoamine oxidase (MAO)	Cardiac valvulopathy, pulmonary hypertension, elevated blood pressure, insomnia, irritability, and depression
Sibutramine (delisted)	A serotonin and noradrenaline reuptake inhibitor	Promoting satiety	Type 2 diabetes mellitus (T2DM) and cardiovascular disease
Fenfluramine (delisted)	5-hydroxytryptamine receptor 2C (5HT 2C) agonist	Appetite suppression mediated by different serotonergic mechanisms	Hallucination, cardiac valve insufficiency, and pulmonary hypertension
Orlistat	Inhibitor of pancreatic and gastric lipases	Inhibiting the activity of pancreatic and gastric lipases	Flatulence, oily spotting, faecal urgency, fatty/oily stool, oily defecation, increased defecation, faecal incontinence and nephrotoxicity, hepatotoxicity, nephrolithiasis and pancreatitis
Phentermine/topiramate	Sympathomimetic amine anorectic	Modulating by various neurotransmitters	Teratogenicity, cardiovascular concerns as well as cognitive, psychiatric and metabolic acidosis
Lorcaserin	5-hydroxytryptamine receptor 2C (5-HT 2C) agonist	Acting on anorexigenic POMC neurons in the hypothalamus	Headache, dizziness, fatigue, nausea, dry mouth constipation, patients with diabetes mellitus on lorcaserin include hypoglycaemia
Naltrexone SR/bupropion SR	Opioid receptor antagonist, dopamine and norepinephrine reuptake inhibitor	Blocks opioid receptor-mediated POMC auto-inhibition, selectively inhibits reuptake of dopamine and noradrenaline	Nausea, headache, constipation, insomnia anxiety, sleep disorder and depressed mood
Liraglutide	Glucagon-like peptide 1 (GLP1) receptor agonis	Prevents the normal activation of the NPY/AgRP system, mediating the effects of GLP-1 receptor stimulation	Nausea, diarrhoea, constipation, vomiting, dyspepsia, abdominal pain, acute gallbladder disease, acute pancreatitis, and risk of severe hypoglycemia

Table S2. Classification and characteristic of algal polysaccharides

	Polysaccharide	Category	Source	Chemical structure	Molecular weight	extraction method
Brown Algae	Alginate	More than 200 different alginates	Brown algae (*Phaeo-phyceae*), including *Laminaria hyperborea, Laminaria digitata, Laminaria japonica, Ascophyllum nodosum,* and *Macrocystis pyrifera*	Composed of (1–4)-linked β-D-mannuronate and α-L-guluronate residues	20 to 350 kDa	Grinding, precipitation in a mild acid medium, ultrafiltration, and dialysis
	Laminaran	/	Algae (such as *giant kelp, seaweed, silquosa, fucus* and *sargasso*) and bacteria (two gram-negative bacterial genera, *Azotobacter* and *Pseudomonas*)	Composed of β (1–3)-linked glucose units with β (1–6)-branches	5 kDa	Alkaline extraction
	Fucoidan	F-fucadoin and U-fucoidan	The brown algae's cell walls, intercellular gaps, produced mucus of marine invertebrates	(1→3)-α- L-fucose or alternating (1→3)-α- L-fucose and (1→4)-α- L-fucose	7 to 2300 kDa	Hot water extraction, acid extraction and alkaline extraction, ultrasonic extraction method, microwave extraction method
Green Algae	Ulvan	Ulvan A, B and its derivatives / intermediates	The cell walls of green algae of the genus *Ulva*	(1→4)-β-glucuronic acid, (1→3,4)-α-L-rhamnose-3-sulphate and (1→4)-α-xylose	from 1 to 2000 kDa	Hot water extraction, acid extraction
	Rhamnan sulfate	/	The cell wall of *Monostroma nitidum*	Long linear chain structures of α-1,3-linked l-rhamnose connected with α-1,2-linked branched chains	>30 kDa	Hot water extraction
Red Algae	Agar	/	The cell walls of *Gelidium, Gracilaria,* and *Gelidiella*	Alternating 1,3-linked β-D-galactopyranose and 1,4-linked 3,6-anhydro-α-L-galactopyranose	~120 kDa	Hot water extraction, alkaline extraction
	Carrageenan	ι-carrageenan, κ- carrageenan and λ-carrageenan	Exists in seaweed or algae (*Chondrus, Eucheuma, Gigartina, Euheuma* and *Rhodophyceae*)	Made up of several repeating units of α-D-galactopyranose linked 1–3 residue and β-D-galactopyranose residues linked through positions 1,4	453 to 652 kDa	Alkaline extraction
Spirulina	Polysaccharide of *Spirulina platensis*	/	*Spirulina platensis*	A backbone of β (1→3) and β (1→6) linked chains and short branches of β (1→2) are attached to the main chain	> 160kDa	Water extraction method, alcohol precipitation method, acid-base extraction method, ultrasonic extraction method, freeze-thaw method, enzymatic hydrolysis method

↑, increased; ↓, decreased; /, not mentioned