CHARACTERISATION OF THE PLASMA LIPOPROTEINS OF THE TAMMAR WALLABY, MACROPUS EUGENII

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There has been much scientific investigation of the plasma lipoproteins of mammalian species, in particular the eutherian mammals. Data on the lipoproteins of the Metatheria are limited, especially of those groups from Australia. This study reports the lipoprotein patterns of the Tammar wallaby.

Blood was collected from the tail veins of 12 Tammar wallabies that had been starved overnight. The plasma was separated and stored on ice for no longer than 24 h before analysis. Four of the samples were used for analytical ultracentrifugation to determine the density distribution of the lipoproteins. With this information, the other eight samples were separated in a preparative ultracentrifuge by a discontinuous density-gradient method. The isolated lipoprotein classes were then analysed for total cholesterol, phospholipid, triacylglycerol and protein.

Results of the analytical ultracentrifugation indicated Tammar very-low-density lipoprotein (VLDL) to be of density <1.006 g/mL, total low-densitv lipoprotein to be in the density range 1.006-1.054 g/mL and high-density lipoprotein (HDL) to be in the range 1.054-1.210 g/mL. Total low-density lipoprotein could be further subdivided into intermediate-density lipoprotein (IDL) of density 1.006-1.019 g/mL and low density lipoprotein (LDL) of density 1.019-1.054 g/mL.

The Tammar wallaby, as in the majority of herbivores, was found to have HDL as the major lipoprotein class. Of the total circulating lipoproteins, HDL accounted for 65% of the total, with progressively smaller proportions of LDL (21%), VLDL (8%) and IDL (6%). Most of the cholesterol, phospholipid and protein were found in HDL, while VLDL carried most of the triacylglycerol (Table 1).

Table 1. Mean (±SEM) lipid and protein contents and composition of the lipoproteins of the Tammar Wallaby (n=8)

	Cholesterol		Phospholipid		Triacylglycerol		Protein	
	(mg/dL	(%)	(mg/dL)	(%)	(mg/dL)	(%)	(mg/dL)	(%)
VLDL	7±1.5	8±1.4	9±1.0	6±2.1	21±2.5	38±7.7	5±0.3	2±0.2
IDL	8±1.3	9±3.7	8±0.6	5±1.8	10±0.7	19±6.3	7±0.7	3±0.2
LDL	30±1.8	33±5.0	42±3.8	27±4.4	6±0.6	11±1.8	41±3.5	17±1.6
HDL	46±1.8	50±3.5	99±6.6	62±3.9	19±3.3	32±8.6	197±14.2	78±1.6

Within the lipoprotein classes, VLDL is mainly triacylglycerol, LDL phospholipid and protein, and HDL protein (Table 2).

Table 2. Mean composition (±SEM) of the lipoproteins of the Tammar wallaby (n=8)

	Cholesterol (%)	Phospholipid (%)	Triacylglycerol (%)	Protein (%)
VLDL	17±1.9	22±1.6	49±2.5	13±1.2
IDL	24±1.7	25±1.0	31±2.3	19±1.3
LDL	25±1.1	35±1.4	5±0.5	34±0.9
HDL	13±0.5	28±2.0	5±0.9	55±3.0

Overall, the lipoprotein profile of the Tammar wallaby is closer to that of the rat than either the rabbit or man. How the Tammar wallaby would respond to the standard atherogenic diets used in animal experiments remains to be elucidated.

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