

ARTERIAL WALL METABOLISM

AND

ATHEROGENESIS

A thesis submitted for the degree

of

Doctor of Medicine

by

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February, 1970

PREFACE

Atherosclerosis and its complications account for a vast amount of human morbidity and mortality. It is a disease characterised by the accumulation of lipid, chiefly cholesterol ester and phospholipid, in the intima and inner media of the aorta and distributing arteries. Present information indicates that the lipid of the atherosclerotic lesion cannot arise unmodified from the blood. Further, it has become apparent that the arterial wall has a metabolic capacity of its own.

In order to clarify the likely role of metabolic processes in early atherogenesis, findings relating to the lipid chemistry of the arterial wall in childhood are reported in this thesis. The difference in handling of fatty acid by normal and atherosclerotic intima is examined. Sites of fatty acid and of choline incorporation into lipid in the atherosclerotic lesion are assessed by autoradiography. The differences in arterial handling of fatty acids according to their degree of unsaturation are considered. Also presented is a study to determine whether there is differential uptake by the atherosclerotic lesion of different forms of cholesterol. Finally, some of the work is elaborated using acetate as substrate for arterial lipids.

Evidence is adduced that phospholipid and cholesterol ester metabolism in the arterial wall are important pathogenetic, but not necessarily aetiological, considerations in the evolution of the atherosclerotic plaque and that most of this metabolism takes place in intimal foam cells.

CONTENTS

PREFACE	i
CONTENTS	ii
DECLARATION	ix
ACKNOWLEDGEMENTS	x
GENERAL INTRODUCTION	
A. General Remarks	1
B. Lipids and Atherosclerosis in Early Life	16
C. Lipid Composition of the Arterial Wall	21
D. Lipid Entry into the Arterial Wall	28
E. Arterial Wall Metabolism	32
1. Lipid Metabolism	34
(1) Fatty Acid	34
(2) Cholesterol	37
(3) Cholesterol Ester	39
(4) Phospholipid	42
(5) Triglyceride	47
2. Carbohydrate Metabolism	48
3. Protein Metabolism	49
4. Metabolism of other Substances	50
5. Factors Affecting Arterial Wall Metabolism	51
(1) Diabetes and Insulin	51
(2) Hypertension	55
(3) Therapeutic Agents	56
F. Intimal Cells	58
G. Removal of Lipid from the Arterial Wall	61
MATERIALS AND METHODS	
A. Materials	65
1. Radioactive substrates	65
(a) ¹⁴ C-labelled Sodium Palmitate	65

	(b)	^{14}C -labelled Sodium Oleate	65
	(c)	^{14}C -labelled Sodium Linoleate	66
	(d)	^3H -labelled Sodium Oleate	66
	(e)	^{14}C -labelled Cholesterol	66
	(f)	^3H -labelled Cholesterol	67
	(g)	^{14}C -labelled Choline	67
	(h)	^{14}C -labelled Sodium Acetate	67
	(i)	^{32}P -labelled Ortho-Phosphate	67
	2.	Thin-layer chromatographic standards	67
		(a) neutral lipids	67
		(b) phospholipids	68
		(c) cholesterol esters	68
		(d) methyl esters	68
	3.	Internal Standards	69
		(a) Heptadecanoic Acid	69
		(b) Cholesterol heptadecanoate	69
		(c) ^{14}C -labelled cholesterol	70
	4.	Lipoprotein $^3\text{H}/^{14}\text{C}$ -labelled Cholesterol	71
	5.	Insulin and Anti-Insulin	72
	6.	Chlorophenoxyisobutyric Acid	76
B.		Arterial Tissues	76
	1.	Rabbit arteries	76
	2.	Human arteries	79
		(a) Metabolic Studies	79
		(b) Chemical Studies	79
C.		Lipid Extraction	82
D.		Chromatographic Methods	82
	1.	Thin-layer chromatography	82
		(a) neutral lipid separation	83
		(b) separation of methyl esters from neutral lipids	84
		(c) phospholipid separation	84
		(d) methyl ester separation	86
		(e) cholesterol ester separation	86

2.	Alumina Column Chromatography	87
3.	Paper Chromatography of Choline	88
4.	Gas-Liquid Chromatography	88
	(a) preparation of methyl esters for gas liquid chromatography	88
	(b) separation of methyl esters	90
	(c) quantitation of lipids	91
	(d) gas-liquid radiochromatography	91
E.	Radio-Assay	94
F.	Chemical Assay	96
	1. determination of phospholipid	96
	2. determination of cholesterol	98
	3. determination of free fatty acid	100
G.	Autoradiography	101
	1. ¹⁴ C-labelled oleic acid	101
	2. ³ H-labelled oleic acid	103
	3. ¹⁴ C-labelled choline	103
H.	Ultracentrifugation	104
I.	Electrophoresis	105
J.	Isolation of Human Intimal Cells	105

Section 1.

ARTERIAL LIPID COMPOSITION
AND ITS RELATIONSHIP TO SERUM LIPIDS

A.	Introduction	111
B.	Human Artery in Early Life	113
	1. Morphological Considerations	113
	2. Free and Ester Cholesterol Content	113
	3. Cholesterol Ester Fatty Acid Composition	120
	4. Phospholipid Content	126

5.	Phospholipid Fatty Acid Composition	129
C.	Normal and Cholesterol-Fed Rabbit	133
D.	Discussion	137

Section 2.

INCORPORATION IN VITRO OF ^{14}C -LABELLED
OLEIC ACID INTO COMBINED LIPID BY THE
RABBIT ARTERIAL WALL.

A.	Introduction	144
B.	Uptake of ^{14}C -labelled Oleic Acid by Normal and Atherosclerotic Rabbit Aortic Intima	145
C.	Incorporation of ^{14}C -labelled Oleic Acid into Combined Lipid by Normal and Atherosclerotic Rabbit Aortic Intima	146
D.	Specific Activity of ^{14}C -labelled Oleic Acid Incorporated into Combined Lipid	152
E.	Autoradiographic Localisation of ^{14}C -labelled Oleic Acid in Rabbit Atherosclerotic Lesions	154
F.	Discussion	157

Section 3.

INCORPORATION IN VITRO OF ^{14}C -LABELLED
OLEIC ACID INTO COMBINED LIPID BY THE
HUMAN ARTERIAL WALL.

A.	Introduction	165
B.	Uptake and incorporation of ^{14}C -labelled Oleic Acid into Combined Lipid by Human Arterial Intima	165
C.	Specific Activity of ^{14}C -labelled Oleic Acid Incorporated into Combined Lipid	169
D.	Autoradiographic Localisation of ^{14}C -labelled Oleic Acid in Human Atherosclerotic Lesions	172
E.	Discussion	180

Section 4.

PHOSPHOLIPID SYNTHESIS BY RABBIT
ATHEROSCLEROTIC AORTA IN VITRO

A.	Introduction	184
B.	Uptake and Incorporation of ^{14}C -labelled Choline into Phospholipid	184
C.	Autoradiographic Localisation of Phospholipid Formation from ^{14}C -labelled Choline in Rabbit Atherosclerotic Lesions	186
D.	Uptake and Incorporation of ^3H -labelled Oleic Acid into Combined Lipid and Extraction of Lipid other than Phospholipid	189
E.	Autoradiographic Localisation of Phospholipid Formation from ^3H -labelled Oleic Acid in Rabbit Atherosclerotic Lesions	194
F.	Discussion	198

Section 5.

PHOSPHOLIPID SYNTHESIS BY THE HUMAN
ARTERIAL WALL IN VITRO

A.	Introduction	203
B.	Uptake and Incorporation of ^{14}C -labelled Choline into Phospholipid	203
C.	Autoradiographic Localisation of Phospholipid Formation from ^{14}C -labelled Choline in Human Atherosclerotic Lesions	204
D.	Uptake and Incorporation of ^3H -labelled Oleic Acid into Combined Lipid and Extraction of Lipid other than Phospholipid	211
E.	Autoradiographic Localisation of Phospholipid Formation from ^3H -labelled Oleic Acid in Human Atherosclerotic Lesions	213
F.	Discussion	213

Section 6.

INCORPORATION OF DIFFERENT FATTY
ACIDS INTO COMBINED LIPID BY RABBIT
ATHEROSCLEROTIC AORTA IN VITRO

A.	Introduction	220
B.	Incubations with ^{14}C -labelled Palmitic Acid and ^{14}C -labelled Linoleic Acid Separately	222
C.	Incubations with ^{14}C -labelled Palmitic, ^{14}C -labelled Oleic and ^{14}C -labelled Linoleic Acids Together	227
D.	Re-incubation of Aortae Labelled with ^{14}C - labelled Palmitic, ^{14}C -labelled Oleic and ^{14}C -labelled Linoleic Acids in non- labelled Incubation Media	232
E.	Discussion	235

Section 7.

DIFFERENTIAL UPTAKE OF CHOLESTEROL
AND OF DIFFERENT CHOLESTEROL ESTERS
BY RABBIT ATHEROSCLEROTIC AORTA IN
VIVO AND IN VITRO.

A.	Introduction	244
B.	Entry of ^3H -labelled Cholesterol into Atherosclerotic Aorta <u>In Vivo</u>	245
C.	Removal <u>In Vitro</u> of ^3H -labelled Cholesterol from the Atherosclerotic Aorta, Labelled <u>In Vivo</u>	253
D.	Entry of $^3\text{H}/^{14}\text{C}$ -labelled Cholesterol into the Atherosclerotic Aorta <u>In Vitro</u>	257
E.	Discussion	263

Section 8.

LIPID SYNTHESIS FROM ^{14}C -LABELLED ACETATE
BY THE ARTERIAL WALL IN VITRO AND FACTORS
AFFECTING IT

A.	Introduction	271
B.	Lipid Synthesis from ^{14}C -labelled Acetate by the Human Arterial Wall, in Isolated Intimal Cells, and the Effect of Chlorophenoxyisobutyric Acid (CPIB)	273
C.	Lipid Synthesis from ^{14}C -labelled Acetate by the Rabbit Atherosclerotic Aorta and the Effect of Chlorophenoxyisobutyric Acid (CPIB)	281
D.	Lipid Synthesis from ^{14}C -labelled Acetate by the Rabbit Atherosclerotic Aorta and the Effects of Insulin and of Anti-Insulin	283
E.	Lipid Synthesis from ^{14}C -labelled Acetate by Human Aortic Segments Proximal and Distal to Coarctation	286
F.	Discussion	294
	GENERAL CONCLUSIONS, PROBLEMS, AND FUTURE INVESTIGATIONS	297
	BIBLIOGRAPHY	303