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Evaluation of Cardiac Troponin "T" and Some Acute Phase Reactant Proteins in Unstable Angina

THESIS

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CONTENTS

List of Abbreviations

AMI	:	Acute myocardial infarction
APRs	:	Acute phase reactants
aa	:	Amino acid
AST	:	Aspartate amino transferase
ALT	:	Alanine amino transferase
AAG	:	Alpha 1- acid glycoprotein
Ca^{++}	:	Calcium ion
cTn-T	:	Cardiac troponin T
CRP	:	C- reactive protein
CK	:	Creatine kinase
CAD	:	Coronary artery disease
IHD	:	Ischemic heart disease
SR	:	Sarcoplasmic Reticulum
Tn-I	:	Troponin I
Tn-C	:	Troponin C
UA	:	Unstable angina

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INTRODUCTION

Chapter (I)

Cardiac Troponin "T"

Structure of myocardial cell

The heart of normal human being is made up of many different types of cells. Cardiac myocytes constitute about 75% of the heart mass. Contraction of these myocytes provides the force needed for the ejection of blood from the ventricles.[1-3]

The cardiac myocyte is approximately 100 μm long and 15 μm wide. It interdigitates in a "stepwise" manner with up to nine adjacent myocytes. At the end of its long axis, each cell is in contact with another through a specialized area of cell membrane called the intercalated disc. This contains particular structures, the fascia adhernes, desmosomes and gap junctions.[3]

The fascia adhernes links adjacent cells mechanically so that force can be transmitted between them when the heart contracts. It is linked to the contractile apparatus by a series of specialized proteins such as titin, α-actinin, filamin and vinculin.[3,4]

Ultrastructure of the contractile cells: (Fig 1)

The contractile proteins of the heart lie within the muscle cells (cardiomyocytes). About ½ of each myocyte is occupied by myofibrils. A myofiber is a group of myocytes held together by surrounding collagen connective tissues.[5] When examined under the light microscope, the atrial and ventricular muscle cells have cross-striations and are branched. Each cell is surrounded by a complex cell membrane, the sarcolemma, and is

filled with contractile elements which are rod like bundles of myofibrils. The sarcolemma of the myocytes invaginates to form an extensive tubular network (T-tubules), that extends the extracellular space into the interior of the cell.[5,6]

The nucleus, which contains almost all of the cell's genetic information, is often centrally located. Some myocytes have several nuclei interspersed between the myofibrils and immediately beneath the sarcolemma there are many mitochondria. Their main function is to generate the energy in the form of adenosine triphosphate (ATP) needed to maintain the heart's contractile function and the associated ion gradients.[2,6] Other important organelle is the sarcoplasmic reticulum (S.R). Anatomically, the S.R. is a fine network spreading throughout the myocytes, demarcated by its lipid bilayer. Parts of the S.R lie in very close apposition to the T.tubulus. These expanded areas of the S.R have several names: sub-sarcolemmal cisternae or "junctional S.R". Their function is to release calcium from calcium releasing channels (also called ryanodine receptor) to initiate the contractile cycle.[6,7]

The second part of the S.R, the longitudinal network consists of ramifying tubules and is concerned with the uptake of calcium that initiates relaxation.[6,7]

The cytoplasm is the intracellular fluid and proteins, the fluid component minus proteins is called the cytosol in which the concentration of calcium ions rises and falls to cause cardiac contraction and relaxation.[6,7] The proteins of the sarcoplasm include many specialized enzymes, that act to accelerate the conversion of one chemical to another, thereby eventually producing energy.[6,7]