

**MOLECULAR INTERACTIONS OF  
LATENT TRANSFORMING GROWTH  
FACTOR- $\beta$  BINDING PROTEIN-2  
(LTBP-2) WITH FIBRILLINS AND  
OTHER EXTRACELLULAR MATRIX  
MACROMOLECULES:  
LTBP-2 COMPETES WITH LTBP-1 FOR  
BINDING TO FIBRILLIN-1 SUGGESTING  
THAT LTBP-2 MAY MODULATE  
LATENT TGF- $\beta$  STORAGE**

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Submitted for the degree of Doctor of Philosophy (PhD) in August, 2006 with permission from the Faculty of Health Sciences, the University of Adelaide.

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                      **Prof. Mark Bartold**

**ACADEMIC DISSERTATION**

This work does not, to the best of my knowledge, contain any material previously published or written by another person except where due reference is given in the text and has not been previously presented as a component of any other academic course. This copy of my thesis may be made available by the University of Adelaide library for loan and photocopying.

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## Published Scientific Presentations

### Poster and Oral presentation

**2004** Matrix Biology Society of Australia and New Zealand (MBSANZ) annual scientific meeting, Perth, Western Australia.

**Hirani, Rena M, Hanssen, Eric, Hew, Fan-Hing and Gibson, Mark**

*Binding studies of recombinant human LTBP-2 with elastic fibre components*

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**Rena Hirani, Eric Hanssen and Mark A. Gibson**

*LTBP-2 competes with LTBP-1 for interaction with fibrillin-1*

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**Rena Hirani, Eric Hanssen and Mark A. Gibson**

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**Rena Hirani, Eric Hanssen, Fan-Hing Hew and Mark A. Gibson**

*Binding studies of recombinant human LTBP-2 with elastic fibre components*

**2003** The Australian Society for Medical Research (AMSR) national scientific conference, Glenelg, South Australia

**Rena Hirani, Eric Hanssen, Fan-Hing Hew and Mark A. Gibson**

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**2003** Matrix Biology Society of Australia and New Zealand (MBSANZ) annual scientific meeting, Acheron, Victoria, Australia

**Hirani, RM, Hanssen, E and Gibson, MA**

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## Awards arising from PhD candidature

- 2005/06-*      **Student representative** for the Matrix Biology Society of Australia and New Zealand
- 2005-*          **Dennis Lowther award** (student poster prize 2005) awarded by the Matrix Biology Society for Australia and New Zealand in Victor Harbor, South Australia
- 2005-*          **Travel Stipend** awarded by the Faculty of Health Sciences, the University of Adelaide to attend the Gordon Research Conference on Elastin and Elastic Fibres in New Hampshire, USA
- 2005-*          **Research Abroad Scholarship** awarded by the University of Adelaide to attend the Gordon Research Conference on Elastin and Elastic Fibres in New Hampshire, USA
- 2004/05-*      **Local organising committee** for the 2005 Matrix Biology Society of Australia and New Zealand (MBSANZ) South Australian meeting held in Victor Harbour
- 2004-*          **Travel award** awarded by the Sydney Tissue Engineering and Matrix (STEAM) organisation, New South Wales, Australia to attend the Matrix Biology Society of Australia and New Zealand (MBSANZ) annual meeting in Perth



## Abbreviations

<b>α-</b>	alpha
<b>β-</b>	beta
<b>Δ-</b>	heat-deactivated (56°C) or (in the case of DNA constructs) has meaning “with removal of”
<b>8-Cys</b>	8-cysteine containing motif, also known as TB (TGF-β binding protein like) domain and CR (cysteine-rich) domain
<b>BCIP-</b>	5-bromo-4-chloro-3-indolylphosphate toluidine salt
<b>βIG-H3-</b>	β-inducible gene-H3
<b>BSA-</b>	bovine albumin serum
<b>BMPs-</b>	bone morphogenetic proteins
<b>C-</b>	carboxy-terminus
<b>Ca<sup>2+</sup>-</b>	calcium ions
<b>CaCl<sub>2</sub>-</b>	calcium chloride
<b>cbEGF-</b>	calcium-binding epidermal growth factor-like
<b>CCA-</b>	Congenital Contractural Arachnodactyly
<b>cDNA-</b>	complementary deoxyribonucleic acid
<b>Da-</b>	Dalton
<b>ddH<sub>2</sub>O-</b>	double distilled water
<b>DMEM-</b>	Dulbecco’s Modification of Eagles Medium
<b>DMSO-</b>	dimethyl sulphoxide
<b>DNA-</b>	deoxyribonucleic acid
<b>E-</b>	embryonic day
<b>ECM-</b>	extracellular matrix
<b>EDTA-</b>	ethylenediaminetetraacetic acid (disodium salt)
<b>EGF-</b>	epidermal growth factor
<b>EK-</b>	enterokinase enzyme
<b>ELISA-</b>	enzyme-linked immunosorbent assay
<b>EMILIN-</b>	elastin-microfibril interface located protein
<b>FBN-</b>	fibrillin
<b>FCS-</b>	foetal calf serum
<b>GAG-</b>	glycosaminoglycan
<b>GDFs-</b>	growth and differentiation factors
<b>HCl-</b>	hydrochloric acid
<b>HEK-</b>	human embryonic kidney
<b>his<sub>6</sub>-tag-</b>	6-histidine tag
<b>hrs-</b>	hours
<b>IPTG-</b>	Isopropyl β-D-1-thiogalactopyranoside
<b>kb-</b>	kilobase
<b>kDa-</b>	kiloDalton
<b>LAP-</b>	latency-associated protein
<b>LLC-</b>	large latent complex
<b>LTBP-</b>	latent TGF-β binding protein
<b>m-</b>	mouse
<b>mRNA-</b>	messenger RNA
<b>MAGP-</b>	microfibril-associated glycoprotein
<b>MFAP-</b>	small microfibril-associated protein
<b>MFS-</b>	Marfan syndrome
<b>MMP-</b>	matrix metalloprotease
<b>N-</b>	amino-terminus
<b>NaCl-</b>	sodium chloride
<b>NBCS-</b>	new born calf serum
<b>NBT-</b>	nitro-blue tetrazolium chloride
<b>NEAA-</b>	non-essential amino acids
<b>Ni-</b>	nickel
<b>nm-</b>	nanometers
<b>NRS-</b>	normal rabbit serum
<b>OCT-</b>	optimal cutting temperature compound

<b>OMIM-</b>	online Mendelian inheritance in man ( <a href="http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=OMIM">http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=OMIM</a> )
<b>PBS-</b>	phosphate-buffered saline
<b>PCR-</b>	polymerase chain reaction
<b>PO<sub>4</sub><sup>-</sup></b>	phosphate buffer
<b>PVDF-</b>	polyvinylidene difluoride
<b>r-</b>	recombinant
<b>rb-</b>	rabbit
<b>RGD-</b>	arginine-glycine-aspartic acid motif
<b>RNA-</b>	ribonucleic acid
<b>RT-PCR-</b>	reverse transcriptase-polymerase chain reaction
<b>SCID-</b>	severe combined immune deficiency
<b>SDS-</b>	sodium dodecylsulphate
<b>SDS-PAGE-</b>	sodium dodecylsulphate-polyacrylamide gel electrophoresis
<b>SLC-</b>	small latent complex
<b>TGFBRI or II-</b>	TGF- $\beta$ type I and II receptors
<b>TB-</b>	TGF- $\beta$ binding protein like domain, also known as 8-Cys (8-cysteine containing) motif and CR (cysteine-rich) domain
<b>TBS-</b>	tris-buffered saline
<b>TGF-<math>\beta</math>-</b>	transforming growth factor- $\beta$
<b>TMB-</b>	tetramethylbenzidine substrate
<b>TTX-</b>	tris/tween-20/triton X-100 buffer
<b>U-</b>	unit(s)
<b>UTR-</b>	untranslated region
<b>V-</b>	volts
<b>v/v-</b>	volume for volume
<b>w/v-</b>	weight for volume
<b>WMS-</b>	Weill-Marchesani Syndrome
<b>x-</b>	times
<b>X-Gal-</b>	5-bromo-4-chloro-3-indolylbeta-D-galactopyranoside

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