

ROLE OF BONE MORPHOGENETIC PROTEIN-2 IN PRIMARY KNEE OSTEOARTHRITIS



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EGYPT



Acknowledgement

- ▶ *Nadia El Kadery, Henaz Khaled & Miriam Bekhit*
- ▶ **Physical medicine Rheumatology and Rehabilitation department .**
- ▶ *My dear patients*
- ▶ *Committee of personalized medicine*





Ain Shams University

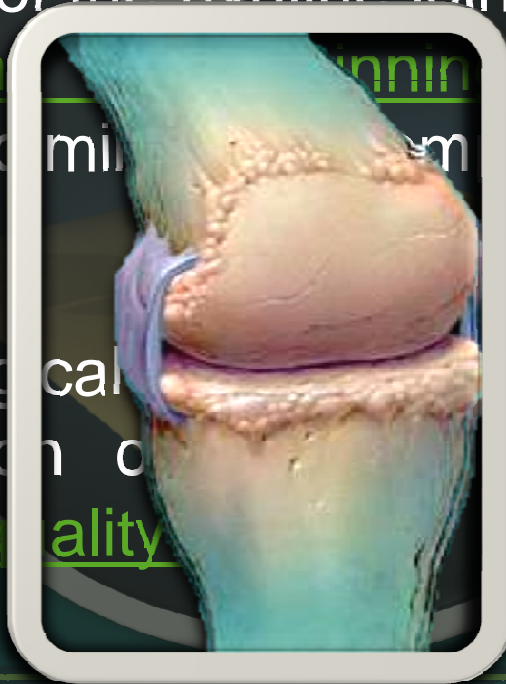


Faculty of Medicine

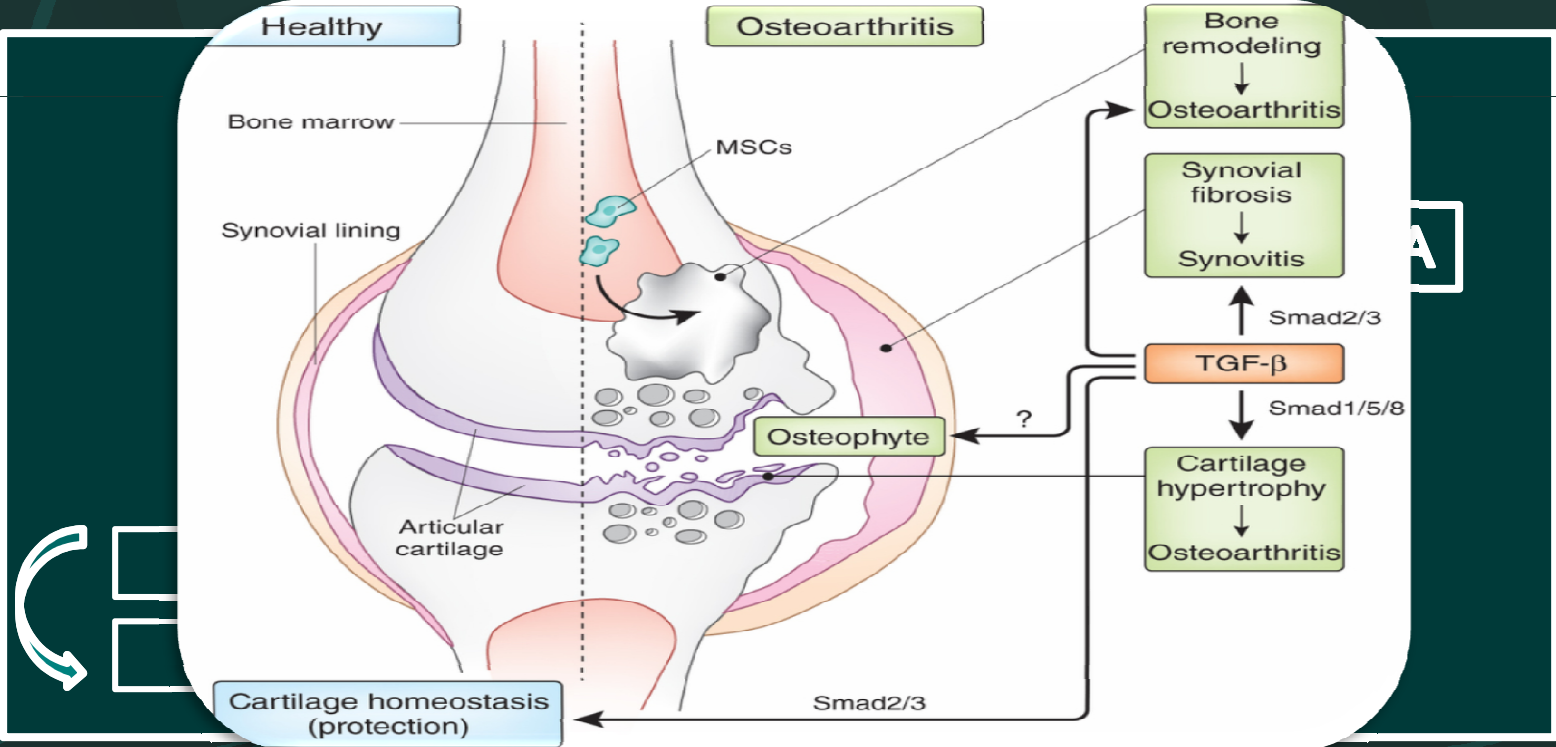


Introduction

- Osteoarthritis is the most prevalent complex, degenerative chronic disease.
- It is a disorder of the hyaline joints characterized by wear, softening, and thinning of the articular cartilage and diminished compliance of the subchondral bone.
- These pathological changes progressively lead to severe limitation of joint activity and great impairment of quality.



Pathogenesis



What are Bone Morphogenetic Proteins ???!

- Although representing the largest subset within the TGF- β superfamily, a larger family of structurally related cell regulatory proteins, BMPs have been demonstrated to induce either cartilage or bone formation in vivo, only.
- They are key regulators of :
 - ✓ *embryonic skeletogenesis,*
 - ✓ *fracture repair,*
 - ✓ *bone regeneration,*
 - ✓ *endochondral ossification*
 - ✓ *bone remodeling.*

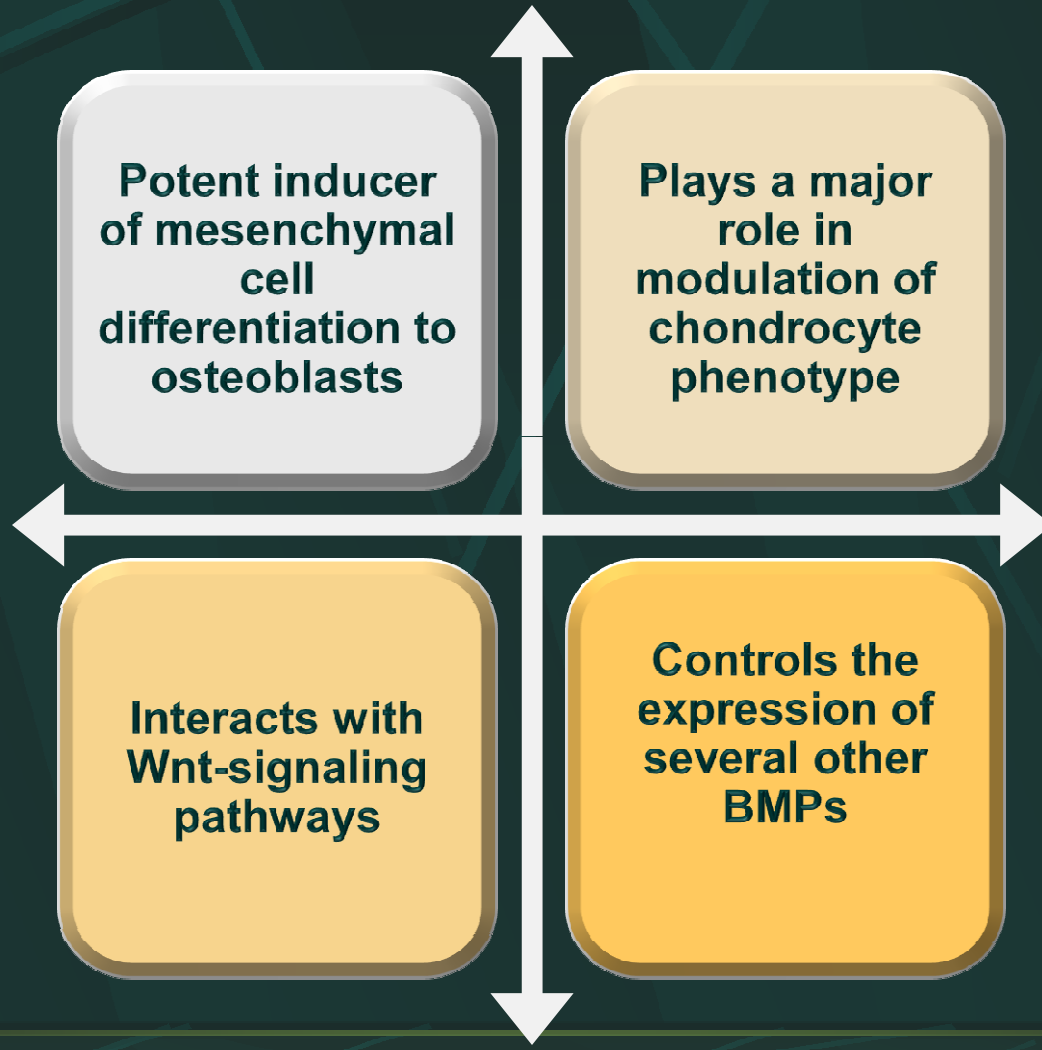
BMP-2

Potent inducer
of mesenchymal
cell
differentiation to
osteoblasts

Plays a major
role in
modulation of
chondrocyte
phenotype

Interacts with
Wnt-signaling
pathways

Controls the
expression of
several other
BMPs





PYRAMIDS & SPHINX

Aim of work

- The aim of this study is to investigate the role of plasma BMP-2 in primary knee osteoarthritis in relation to disease severity.

Patients and Methods

- The study was conducted on thirty symptomatic patients with primary knee osteoarthritis.
- Seventy healthy asymptomatic individuals of the same age and sex were recruited as control group. They were recruited from the University Hospitals., Eilat.
- They were diagnosed according to the American College of Rheumatology (ACR) criteria (Altman et al., 1986).



The patients were subjected to the following:

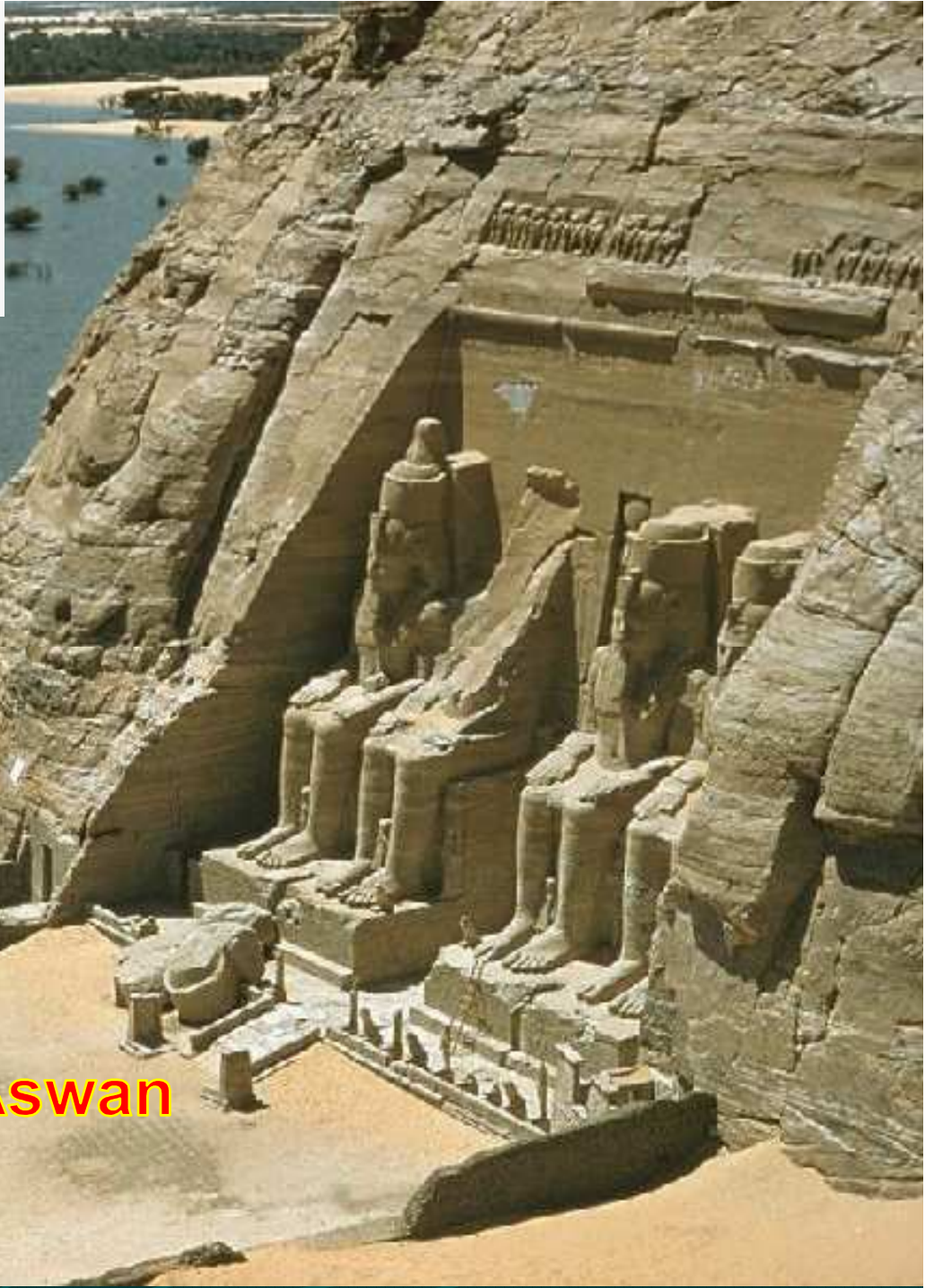
- **Full medical history taking**
- **Thorough clinical examination**
- **Routine laboratory investigations as:**
 - ✓ **Complete blood count (CBC)**
 - ✓ **Erythrocyte Sedimentation Rate (ESR)**
 - ✓ **C- Reactive Protein (CRP)**
 - ✓ **Rheumatoid factor (RF)**
 - ✓ **Fasting blood sugar (FBS)**

Functional Assessment

Pain subscale How much pain do you have ...	None	Mild	Moderate	Severe	Extreme
Walking on a flat surface?					
Going up or down stairs?					
At night while in bed?					
Sitting or lying?					
Standing upright?					
Stiffness Subscale How severe is your stiffness after first waking in the morning?	None	Mild	Moderate	Severe	Extreme
How severe is your stiffness after sitting, lying down, or resting later in the day?					
Function Subscale What degree of difficulty do you have with ...	None	Mild	Moderate	Severe	Extreme
Descending stairs?					
Ascending stairs?					
Rising from sitting?					
Standing?					
Bending to floor?					
Walking on a flat surface?					
Getting in or out of a car?					
Going shopping?					
Putting on socks or stockings?					
Rising from bed?					
Taking off socks or stockings?					
Lying in bed?					
Getting in and out of the bath?					
Sitting?					
Getting on or off the toilet?					
Heavy domestic duties?					
Light domestic duties?					

Radiological Investigations

- The severity of the disease was determined using plain X-ray antero-posterior and lateral radiographs of the knees, evaluated according to the **Kellgren and Lawrence scoring system** (Kellgren and Lawrence, 1957).

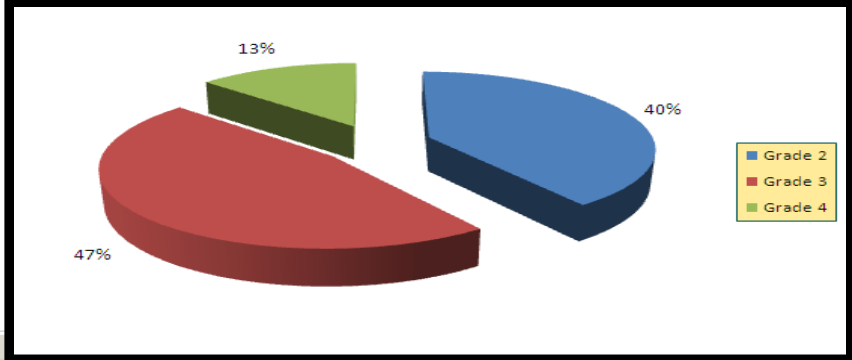


**Abou Simbel Temple -Aswan
(EGYPT)**

Results

Radical joint arthroplasty is a highly effective method of relieving pain and restoring function to

		ESR		Sig.
Parameter		No	%	
K-L grading score	Grade 1	0	00.0%	
	Grade 2	12	40.0%	
	Grade 3	14	47.0%	
	Grade 4	4	13.0%	
BMI (kg/m ²)				NS
ESR (mm/h)				S
ALP (U/L)				NS
BMP-2 (pg/ml)				HS
First carpometacarpal joint affection		2	6.7%	
Heberden and/or Bouchard nodes		3	10.0%	
BMP-2 (pg/ml)	2000 – 5500	3362.5±1055.513		
BMP-2 (pg/ml)	5500 – 17500	7473.33±2336.21		



Results



Age	65.12±5.1	65.12±5.1	65.12±5.1		NS
BM	70±2	70±2	70±2		NS
Di	±2	±2	±2		NS
(ye					
Me	±2	±2	±2		NS
(minutes)					
WOMAC score	20.67±3.14	27.64±4.48	52.75±9.39	< 0.01	HS
BMP-2 (pg/ml)	6208.33±492.60	7207.14±599.31	12200±3713.94	< 0.01	HS
ESR					NS
FBS (mg/dl)		0.168	> 0.05		NS
Varus deformity	Positive 12 (16.7%)	Positive 15 (35.7%)	Positive 17 (47.2%)	< 0.05	NS
	Negative 58 (83.3%)	Negative 29 (71.4%)	Negative 37 (102.8%)		

showing the results of the study on the effect of EBM on the knee joint.

Con**clu**sion

A magnifying glass with a black handle and a silver rim is positioned over the word 'Conclusion'. The letters 'clu' are magnified within the lens.

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Conclusion

- In the current study, patients with **high** plasma levels of **BMP-2** had **longer disease duration** and experienced **significantly more severe K-L and WOMAC** scores.
- So BMP-2 levels correlate with radiographic **severity of O.A.** which make it a biomarker measurement. It is not only a **substitute marker** for the disease but also has the potential to contribute to the **fundamental processes** underlying the **pathogenesis of O.A.**

Conclusion *cont.*

- Although BMPs are considered protective for articular cartilage these factors can also be involved in chondrocyte hyperplasia and matrix degradation.

Bone
morphogenetic
Proteins

&

Articular
cartilage

- Elements in damaged cartilage on one side stimulate tissue repair and matrix synthesis but on the other side stimulate cartilage degeneration by altering chondrocyte behavior and stimulating matrix expression.

To serve and protect or a wolf in sheep's clothing?!!!



Red Sea- EGYPT

Recommendations

- **BMP-2** is likely to be a **useful potential marker** to monitor the **course and severity** of primary knee OA.
- Our preliminary data should be confirmed on **larger** sample size starting study about the possibility of **BMP-2 as** **other** **potential therapeutic targets** **synovial level** of BMP-2.
- Further studies are recommended to define the potential experimental strategies for **the inhibition of BMP-2 mediated O.A process.**

The word "EGYPT" is written in a bold, black, serif font. It is flanked on both sides by a stylized representation of the Egyptian flag, consisting of three horizontal stripes: red on top, white in the middle, and black on the bottom.

EGYPT

The text "THE END." is centered on a large, rectangular area with a light brown, textured background that resembles aged paper or parchment. The text is in a bold, black, serif font.

THE END.



Any questions ??????????

What some people think about EGYPT !

What Egypt really is !

