

**The Comparison of Plasma
Homocysteine and
C-Reactive Protein
Levels in
gestational diabetic patients
and non-diabetic subjects**

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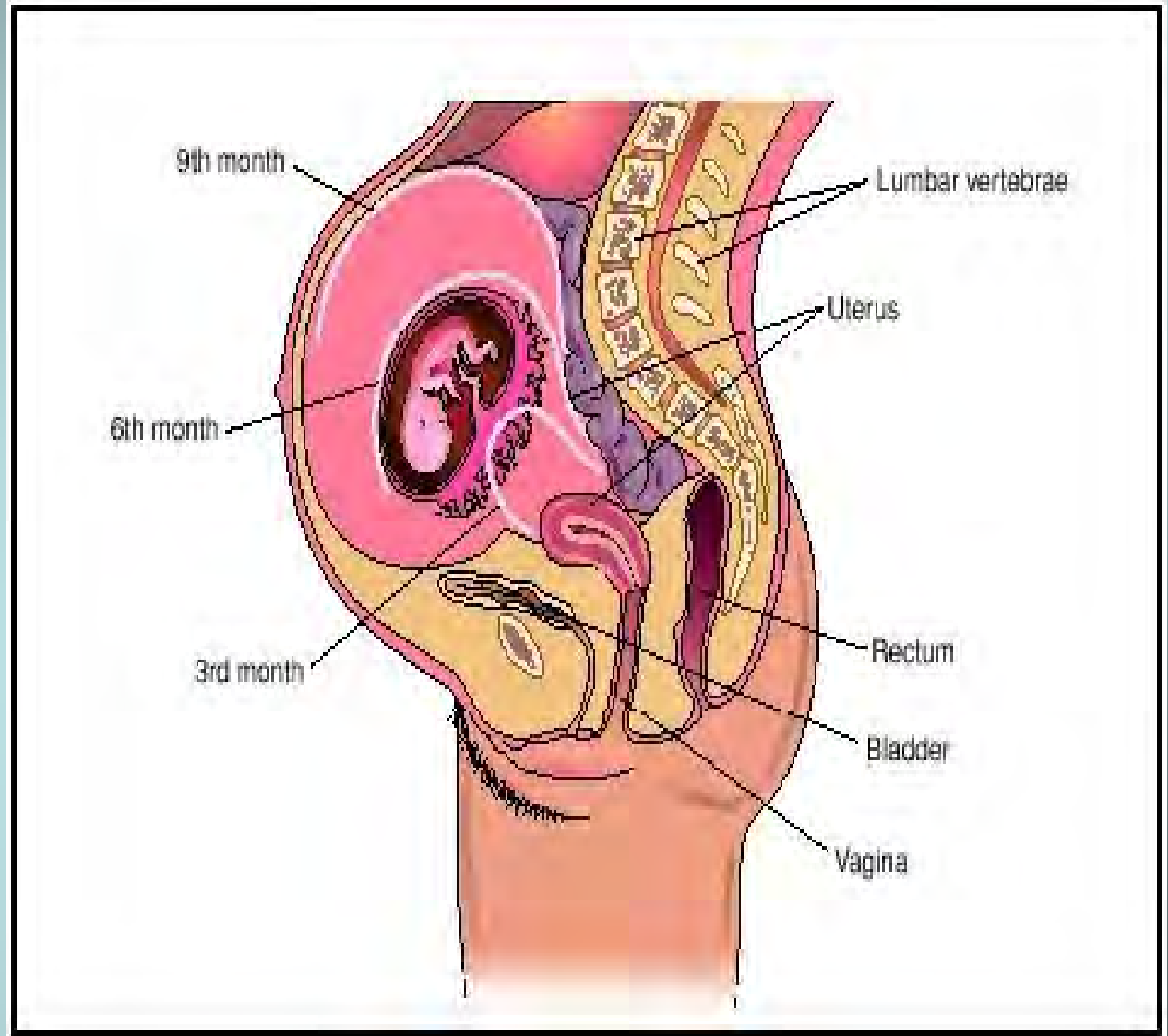
Gestational Diabetes=GDM

- **Definition:** Hyperglycemia with onset or first recognition during Pregnancy
- **Prevalence :** 3.7% in non-aboriginal
8-18% in aboriginal populations

Screening: All women should be screened for GDM between 24-28 weeks

Physiology of GDM

- Gestational hormones induce insulin resistance



Diagnosis of Gestational Diabetes

Gestational Diabetes Screen (GDS)

1 hr after 50g load of glucose



Value	Result
<7.8 mmol/L <140mg/dl	no
7.8-10.2 mmol/L 140-200mg/dl	Yes 75 g OGTT indicated
10.3 mmol/L< 200mg/dl<	GDM

Diagnosis of Gestational Diabetes

75 g OGTT

- **GDM** = 2 or more values greater than or equal to

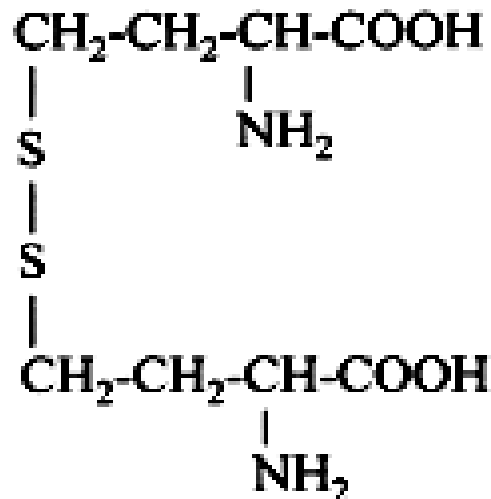
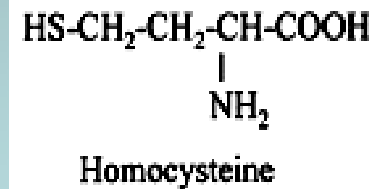
Fasting	≥ 5.3 mmol/L
1 hr	≥ 10.6 mmol/L
2 hr	≥ 8.9 mmol/L

Homocysteine

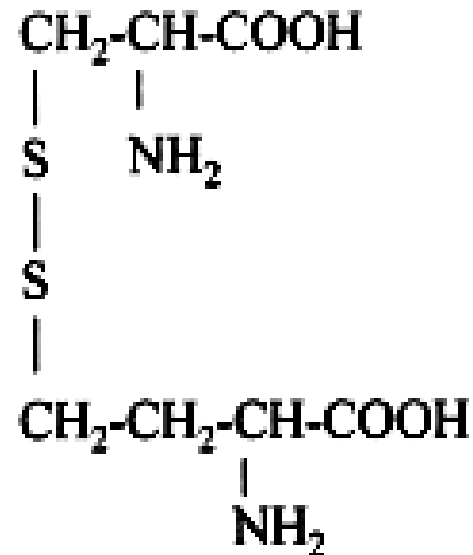
sulfur-containing amino acid

an intermediate product of methionine metabolism

different forms in plasma/serum



Homocysteine-homocysteine disulfide
(Homocystine)



Cysteine-homocysteine disulfide



Studies

Plasma homocysteine levels is an independent risk factor for cardiovascular disease.

(Kuller., 2009;Hankey et al., 2010;Keebler et al, 2002)

Plasma homocysteine levels is normally $<$ or $=$ 12 micromol/L, but when it elevated has many deleterious cardiovascular effects.

(Warren. et al, 2009)

High homocysteine levels in plasma promotes oxidant injury to the vascular endothelium, and it damage leads to platelet activation and thrombus formation . 8

(Loscalzo et al., 2008;Maxwal. Et al, 2007)

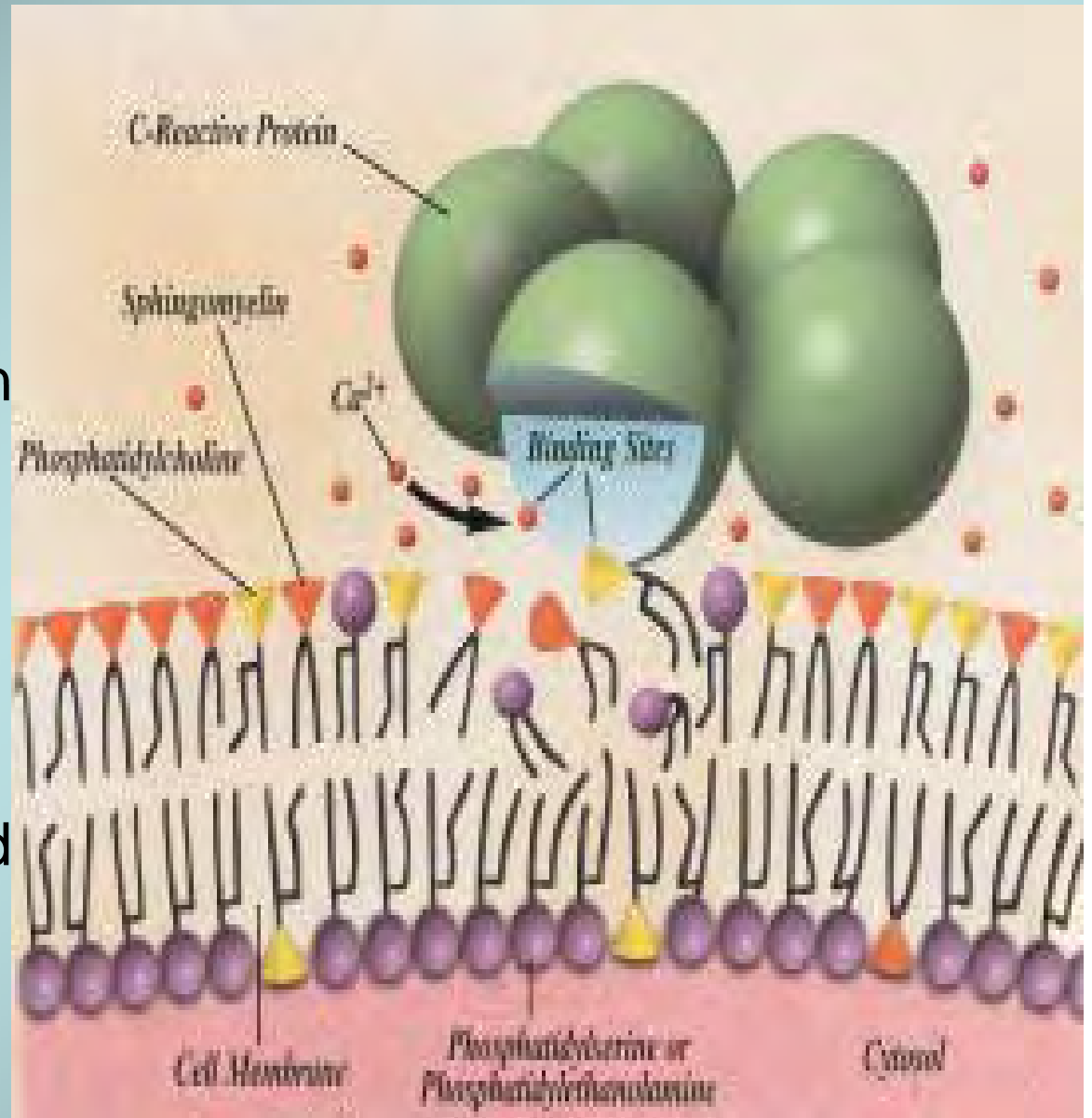
C-reactive protein

- **C-reactive protein (CRP) is an acute phase reactant made in the liver.**
- **CRP is released into the serum as a result of inflammation or tissue damage caused by infection, trauma, surgery, or other inflammatory disorders.**
- **Concentration levels in the serum could be a good indicator of heart disease, stroke or other diseases involving inflammation.**



What does CRP bind to?

- CRP has the highest affinity for phosphocholine on bacteria or as a mixture of sphingomyelin and phosphatidylcholine in eukaryotic membranes.
- CRP can also recognize self ligands such as plasma lipoproteins, damaged cell membranes, **damaged proteins**, and apoptotic cells.



CRP and Cardiovascular Disease

- CRP is known to bind to damaged proteins.
- When CRP binds to LDL in plaques it creates an inflammatory response bringing in complement proteins and other inflammatory reactants.
- Inflammation in the plaque could cause blockage leading to a heart attack or stroke.



Studies



Plasma CRP levels is an independent risk factor for inflammation and cardiovascular disease.

(Libermann, 2010; Yamashita et al., 2006; Keebler et al, 2002)



CRP levels is normally $<$ or $=$ 6 mg/dl in male, $<$ or $=$ 5.1 mg/dl in female, and but when it elevated has many deleterious in diabetes and cardiovascular disease.

(Karen. et al, 2009)



High CRP levels in increase plasma lipid and insulin tolerance . [Ferri et al., 2010](#); [Mishigara Et al, 2007](#))

Materials & Methods

- **The present study was undertaken in 50 gestational diabetic patients and 50 non-diabetic subjects that the age and sex matched healthy volunteers and consult to Hamedan Fatemyeh hospital.**
- **Their venous blood sample were collected and separated the plasma fractions.**
- **Then, the plasma Homocysteine levels were measured by Immonouassay Enzyme kit(Axis-Shield).**
- **The plasma CRP levels were measured by ELISA kit(Omega).**
- **Data analyzed by SPSS program.**

Results



Plasma **homcysteine** levels in gastational diabetic patients & non-daiabetic subjects

Factor	GDM (n=50)	Normal (n=50)
Hcy ($\mu\text{mol/L}$)	9.92 \pm 0.6	8.5 \pm 0.3
	*P<0.001	



Plasma **C-reactive protein** levels in gestational diabetic patients & non-diabetic subjects

Factor	GDM (n=50)	Normal (n=50)
CRP (mg/dl)	12.3 ±0.8*	5.1 ±0.3
	*P<0.001	

Conclusion

- These results showed that the plasma homocysteine and CRP levels were increased in gestational diabetic patients and thus it can be suggested that may be relationship between elevated these risk factors levels and increased risk of cardiovascular disease.

References:

- 1- Thornalley PJ, Langborg A, Minhas HS. Formation of glyoxal, methylal and deoxyglucosone in the glycation of proteins by glucose. *Biochem J* 1999; 344: 109-116.
- 2- Metzger BE. Summary and recommendations of the second international workshop-conference on gestational diabetes mellitus. *Diabetes* 1985 ; 34 :123-126.
- 3-Kannel WB. Overview of hemostatic factors involved in atherosclerotic cardiovascular disease. *Lipids* 2005 Dec; 40(12): 1215-20.
- 4- Low AF, Seow SC, Yeoh KG, Lim YT, Tan HC, Yeo TC. High-sensitivity C-reactive protein is predictive of medium-term cardiac outcome in high-risk Asian patients presenting with chest pain syndrome without myocardial infarction. *Ann Acad Med Singapore* 2004 Jul;33(4): 407-12.
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A scenic landscape photograph of a mountain valley. In the foreground, a river flows through a lush green forest. The middle ground shows a wide, rocky riverbed with several smaller streams. The background features majestic, snow-capped mountains under a blue sky with scattered white clouds. The overall scene is vibrant and natural.

Thank you !

Amir Ali Khan