Madrid, 2 de Diciembre de 2015
SEXTAS JORNADAS CIENTÍFICAS DEL CEIPC

La salud cardiovascular empieza antes de nacer

-programación fetal-

Fatima Crispi

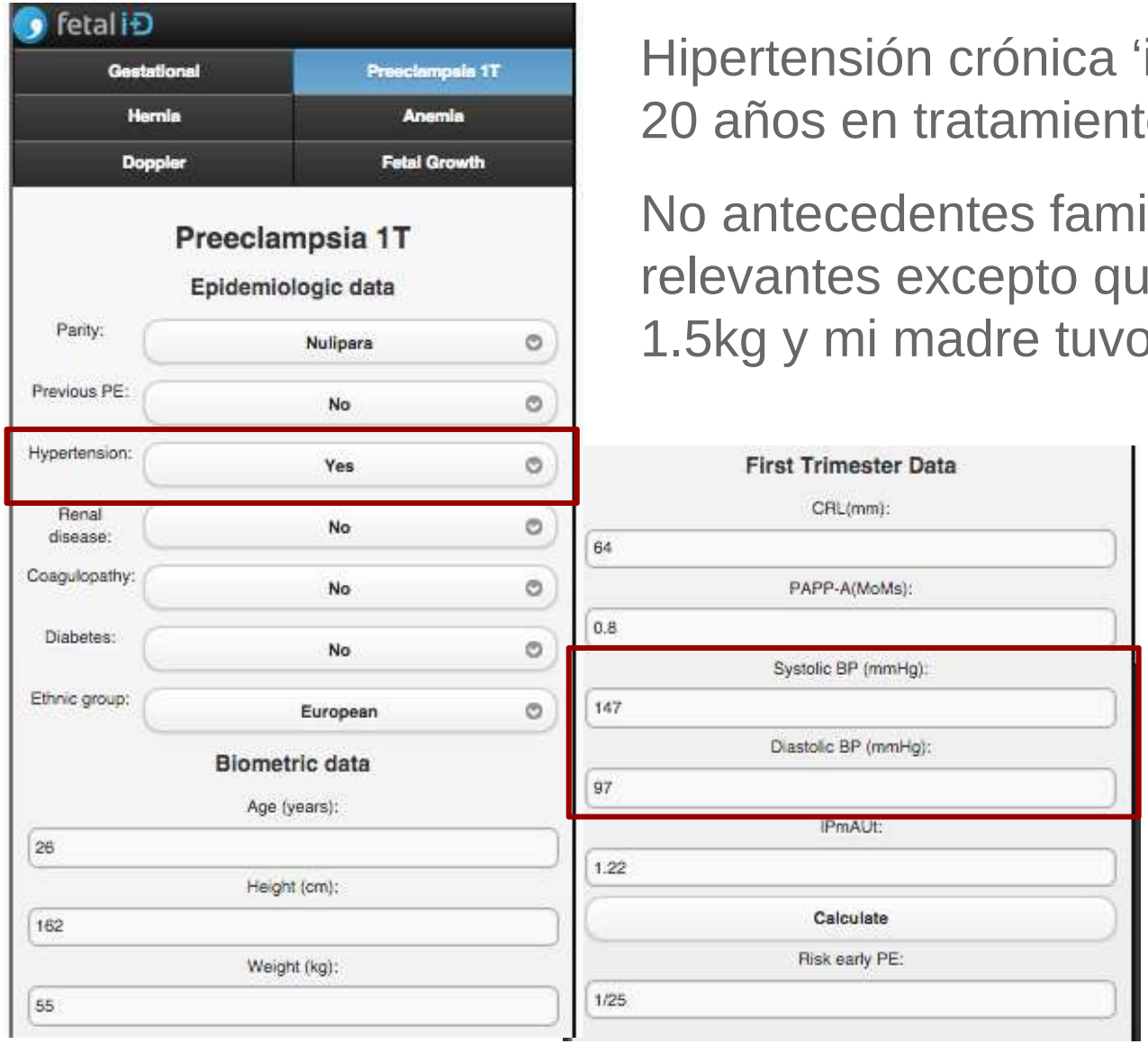
BCNatal – Barcelona Center of Maternal-Fetal Neonatal Medicine
Hospital Clínic and Hospital Sant Joan de Déu
Barcelona University

Disclosures: none

www.medicinafetalbarcelona.org/

caso clínico

Gestante de 15 setmanes
Cribado de primer trimestre: riesgo preeclampsia 1/25

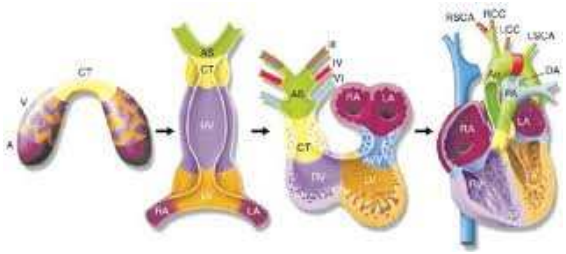


Hipertensión crónica ‘idiopática’ des de los 20 años en tratamiento con IECAs

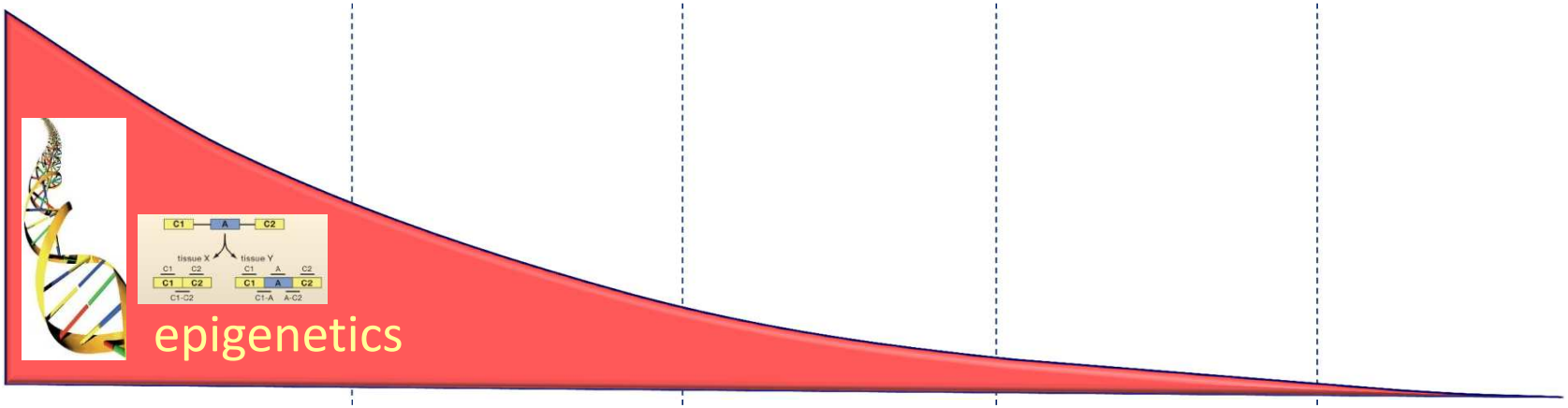
No antecedentes familiares ni personales relevantes excepto que ‘nací prematura con 1.5kg y mi madre tuvo la tensión alta…’

Biological programming and age



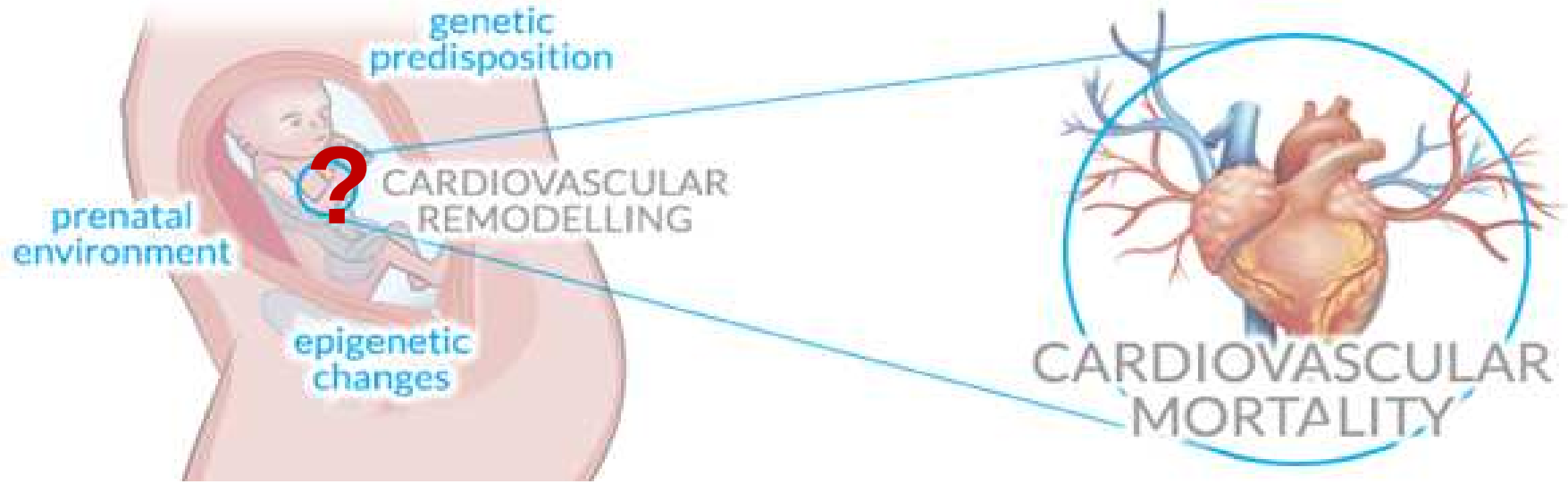


IMPACT OF ENVIRONMENT

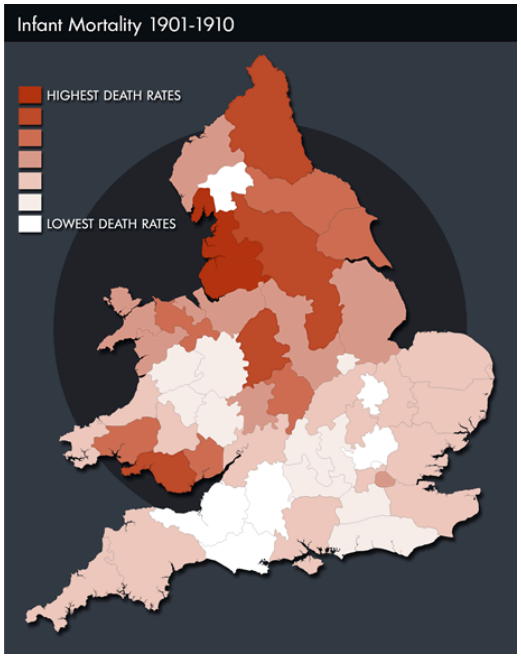


FETAL PROGRAMMING

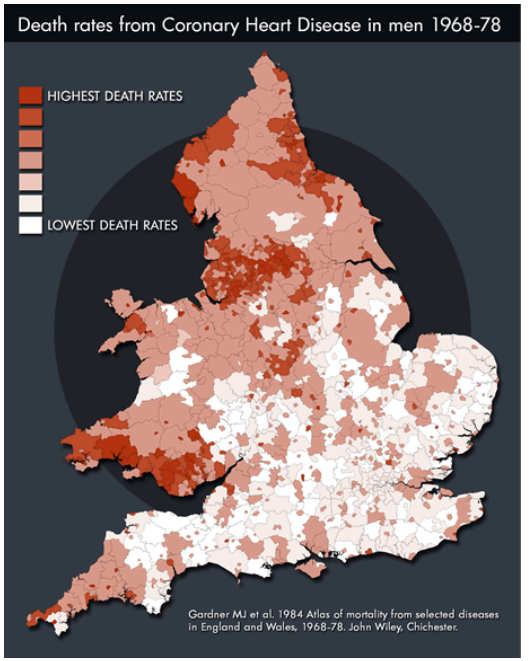
DEVELOPMENTAL ORIGINS OF CARDIOVASCULAR DISEASE



PRENATAL

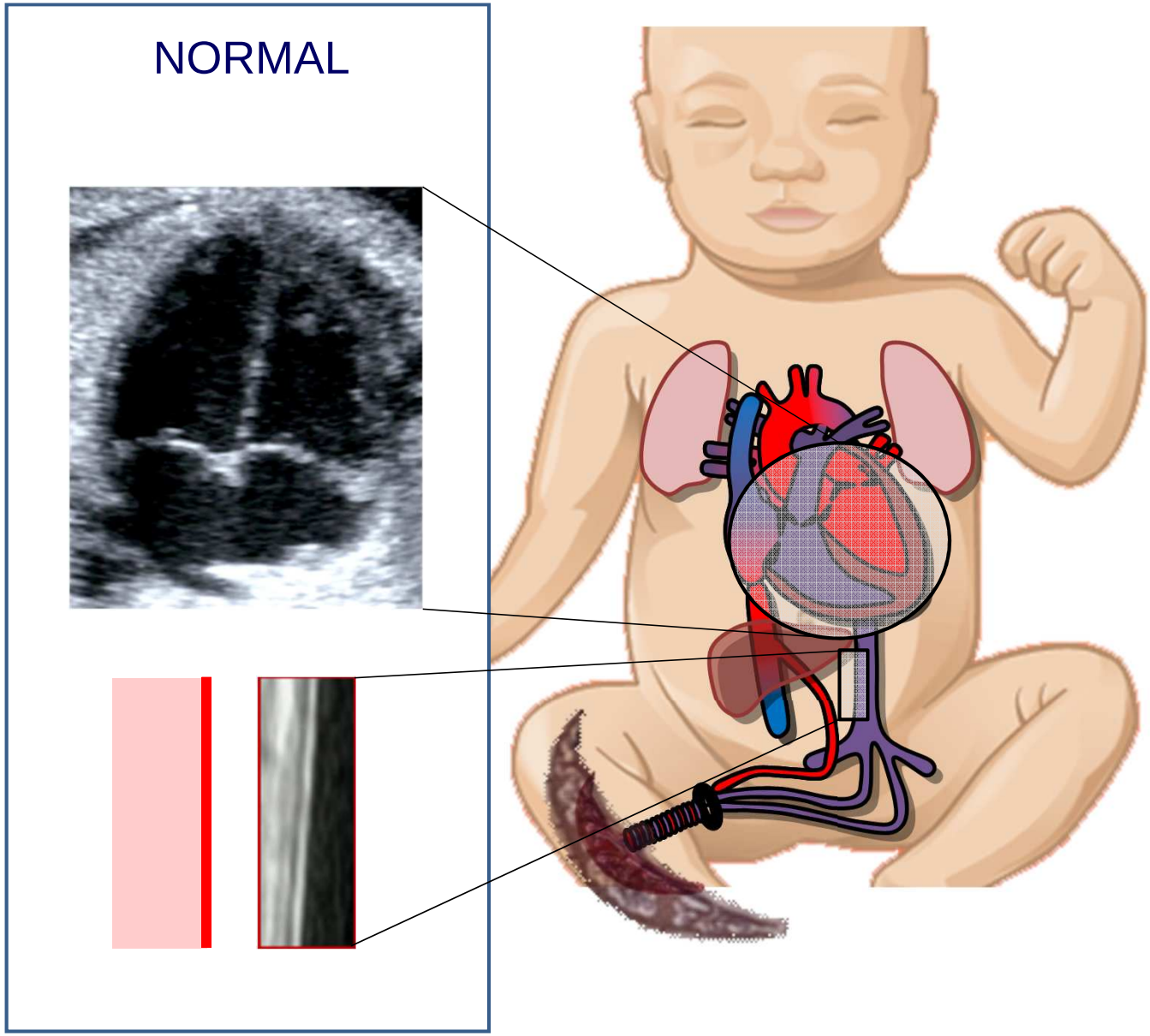


ADULTHOOD



Barker 1990

fetal cardiovascular remodelling in IUGR



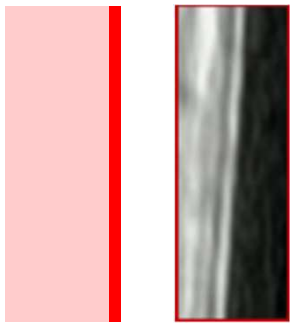
Crispi AJOG 2008, Cruz-Lemini AJOG, 2013, Stergiotou UOG 2014, Perez-

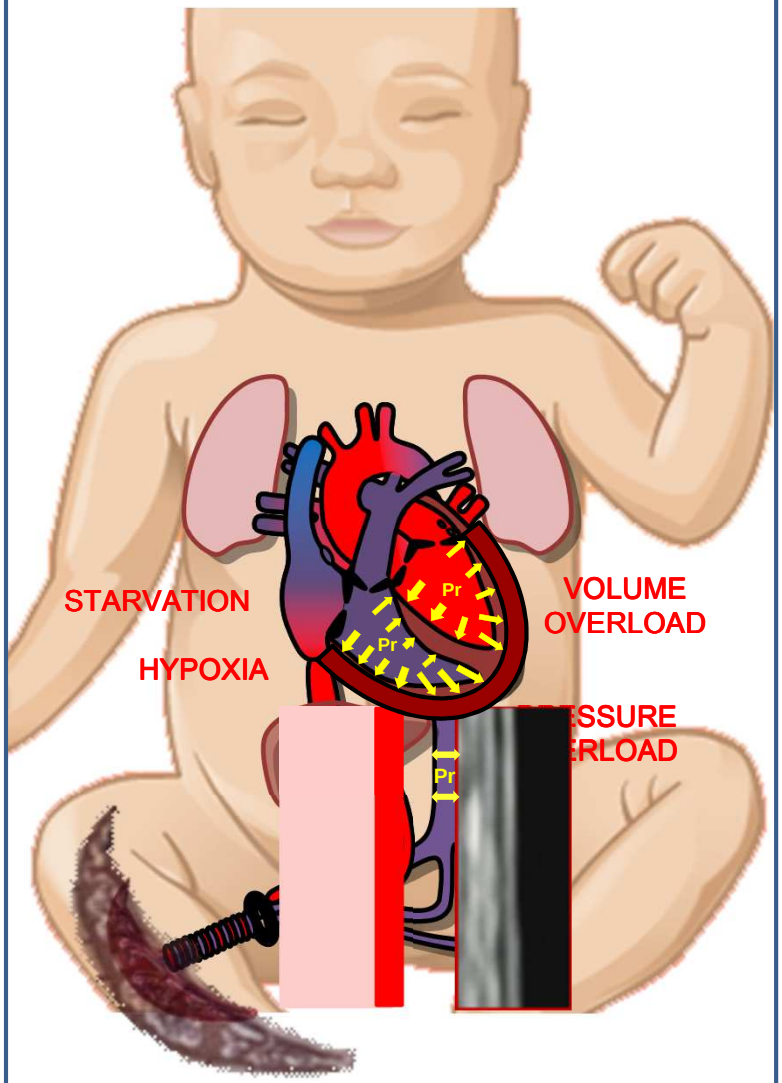
fetal cardiovascular remodelling in IUGR

PLACENTAL INSUFFICIENCY → COMPENSATED HYPOXIA → DECOMPENSATED HYPOXIA

NORMAL







PLACENTAL INSUFFICIENCY

IUGR

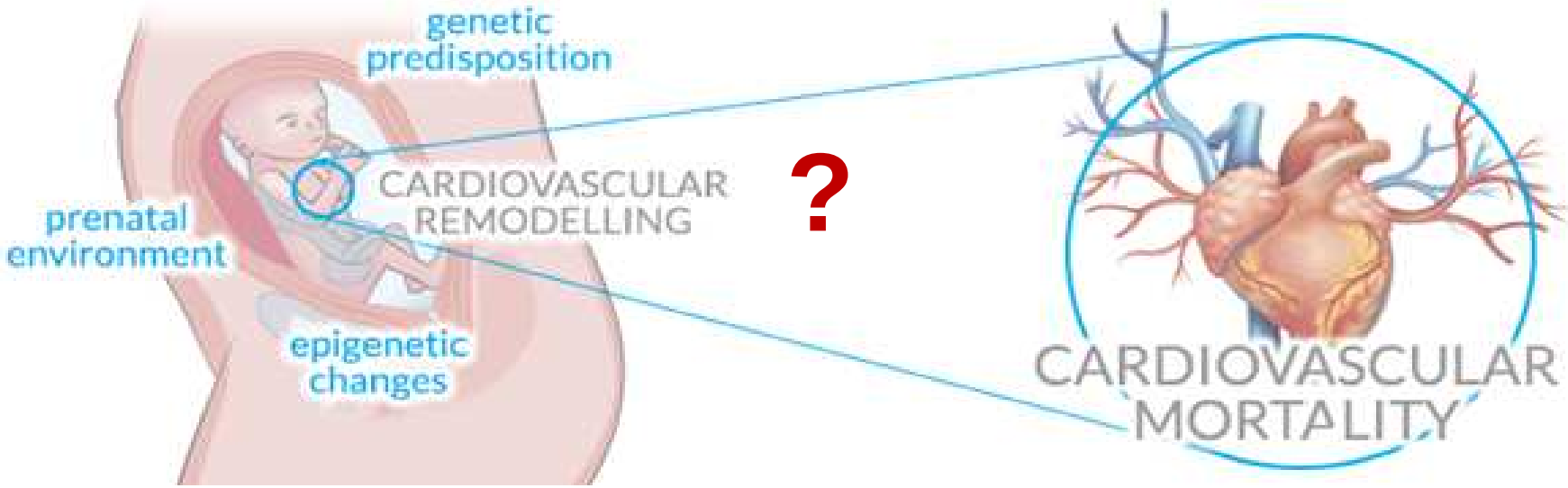
more globular heart
systolic & diastolic dysfunction



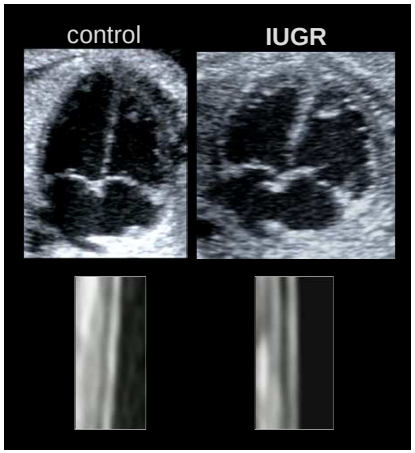
increased BP & aIMT

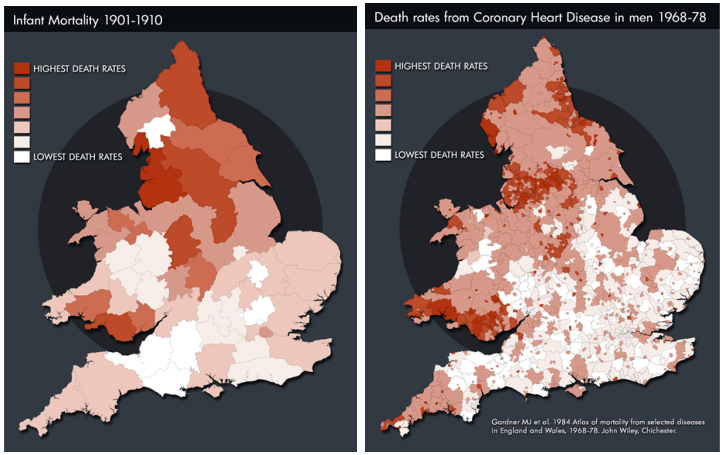
Crispi AJOG 2008, Cruz-Lemini AJOG, 2013, Stergiotou UOG 2014, Perez-

DEVELOPMENTAL ORIGINS OF CARDIOVASCULAR DISEASE



PRENATAL CHILDHOOD ADULTHOOD





Skilton Lancet 2005,Crispi AJOG 2008, Crispi Circulation 2010, Cruz-Lemini AJOG 2013, Stergiotou UOG 2014

cardiovascular remodelling in childhood

Cardiovascular remodelling

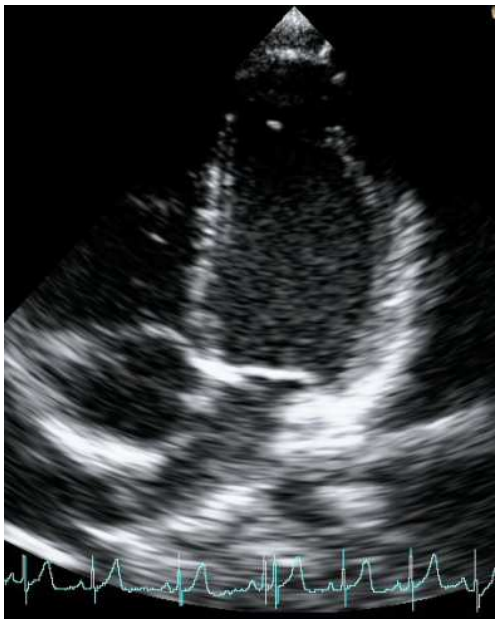
globular heart
↓longitudinal motion
↓stroke volume
↑heart rate
= cardiac output

hypertension
pre-arteriosclerosis

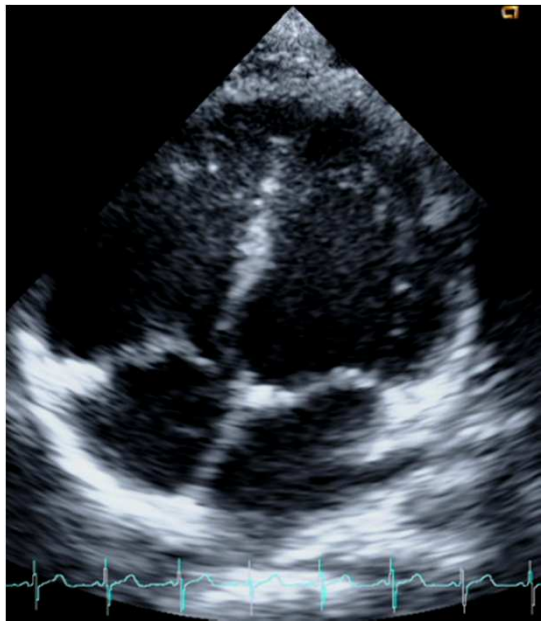


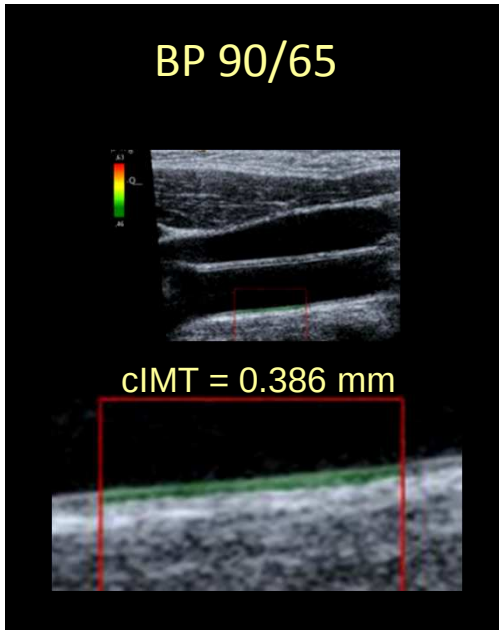


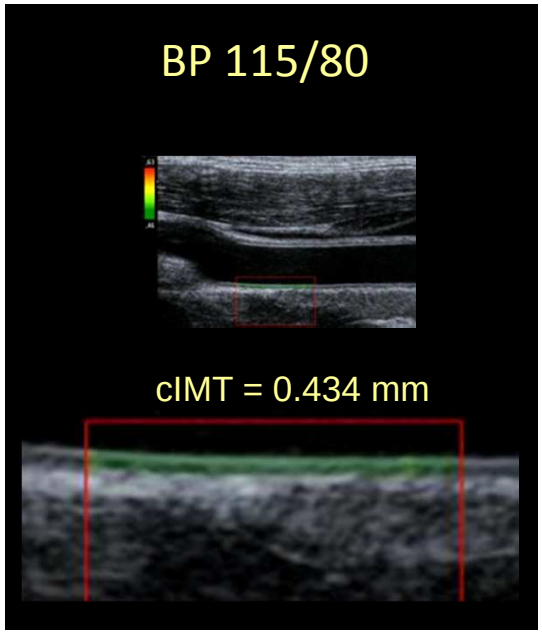
control



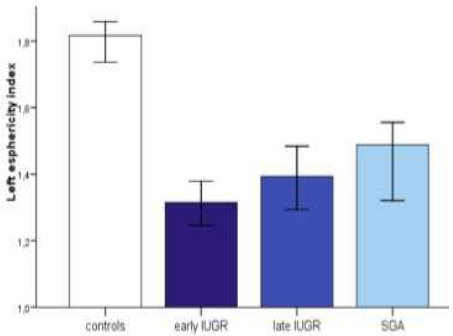
IUGR







IMPACT OF LATE IUGR/SGA



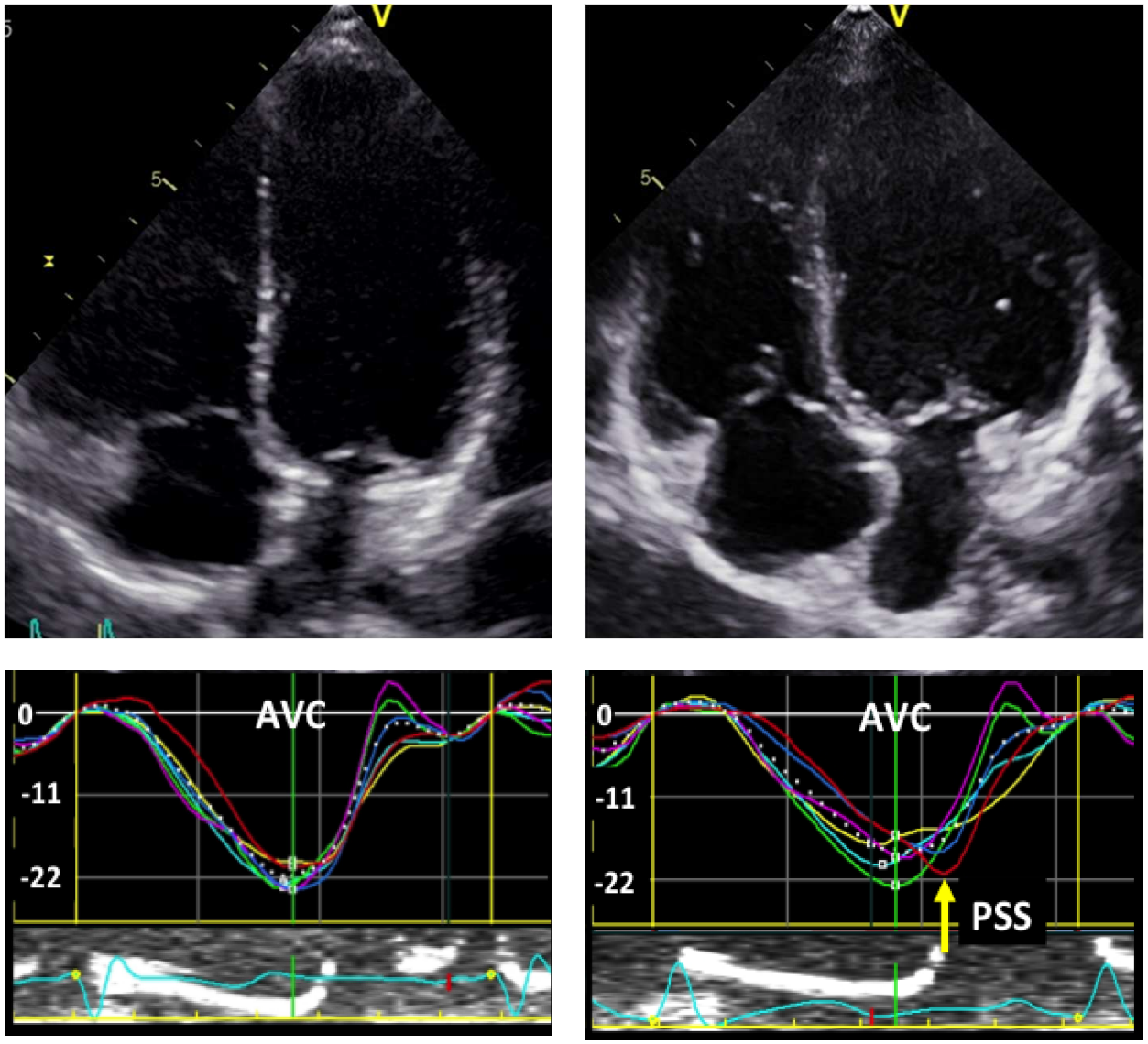
near term SGA fetuses without signs of poor prognosis also presented CV remodeling

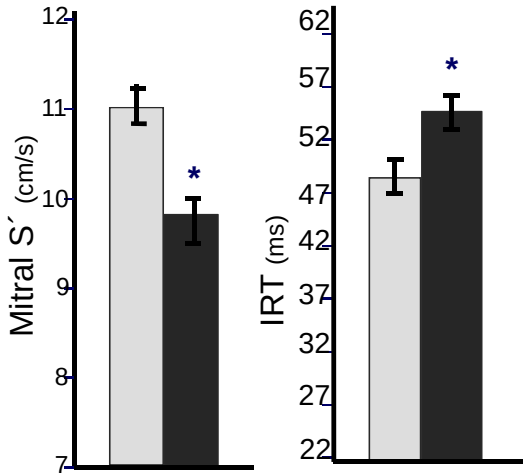
Skilton Lancet 2009, Crispi Circulation 2010, Crispi AJOG 2012

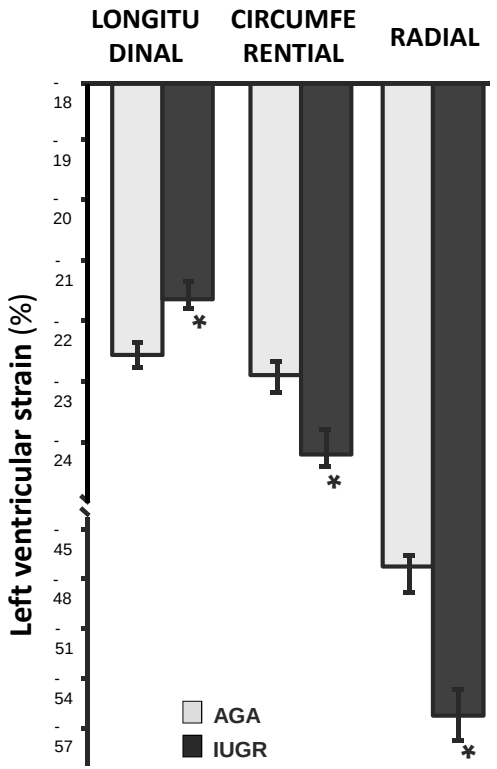
cardiovascular remodelling in adolescence

controls

IUGR





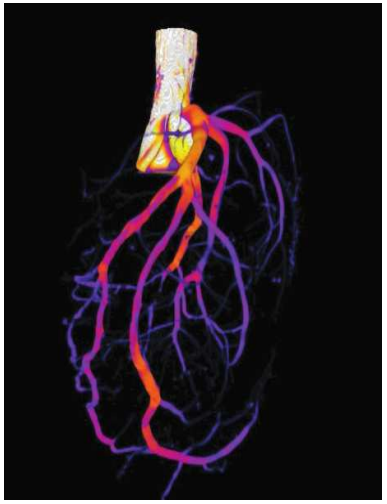


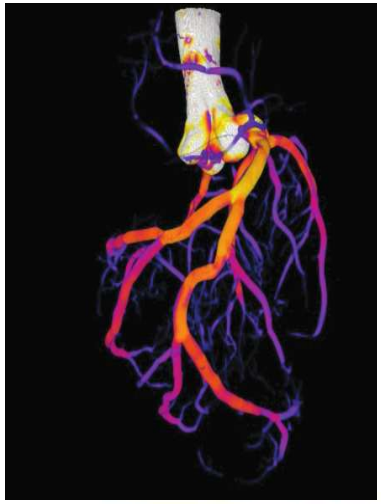
Sarvari submitted 2015

postnatal cardiovascular remodelling

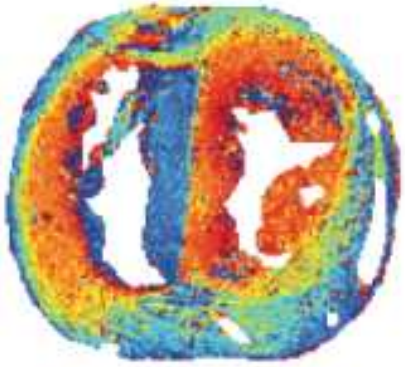
control | **IUGR**

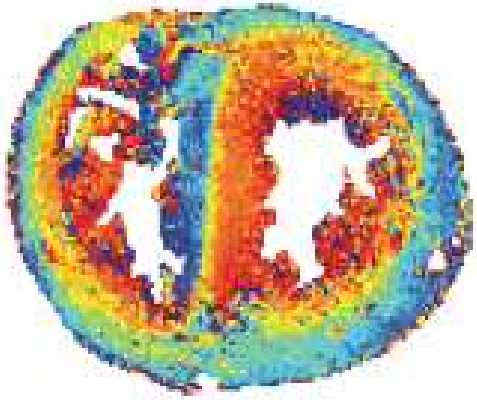
dilated
coronary arteries





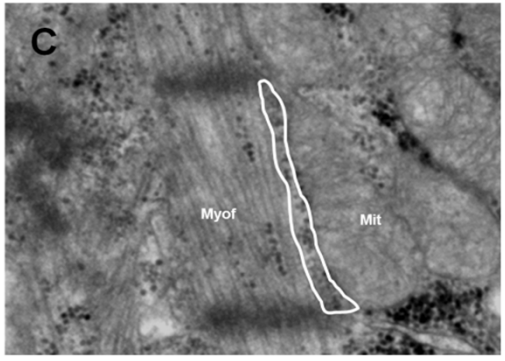
predominance of
circumferential fibers

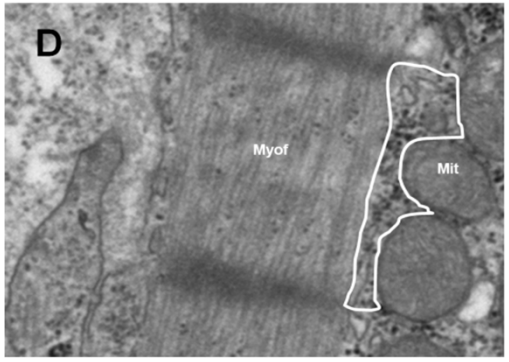


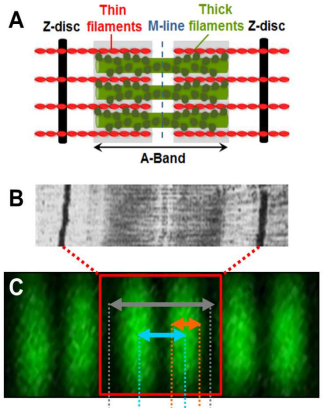


altered
intracellular structure

shorter
sarcomere lenght

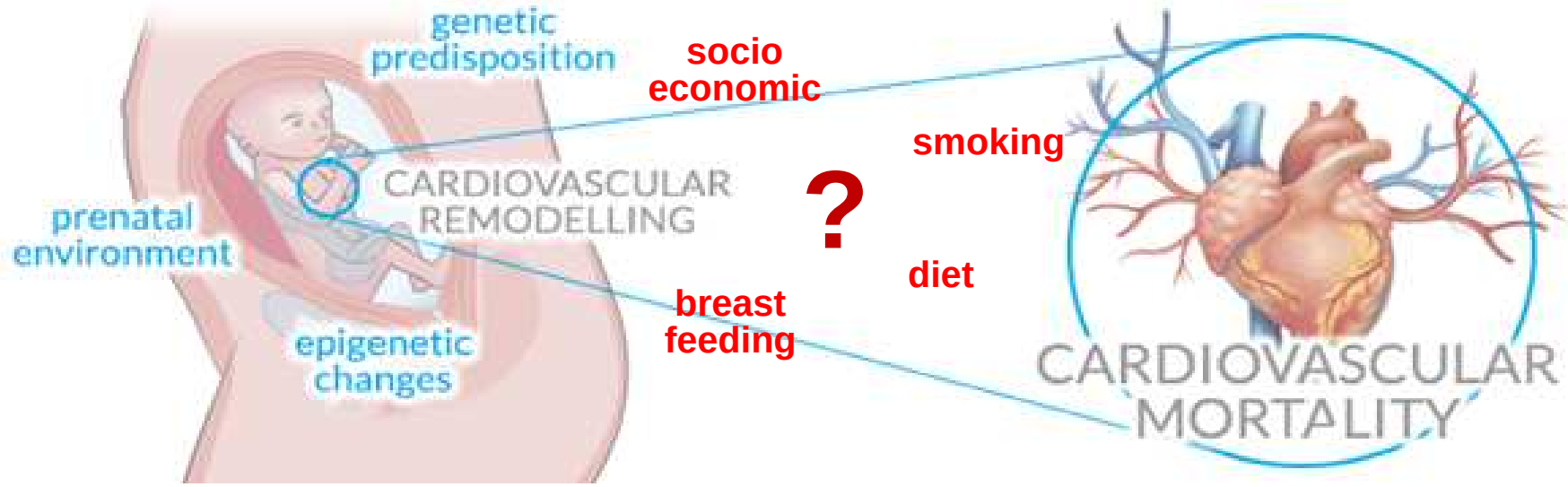




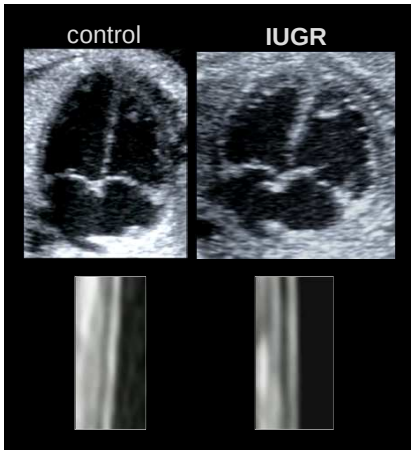


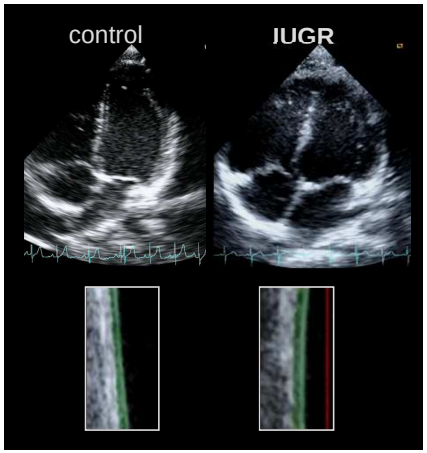
Gonzalez-Tendero Am J Physiol Heart Circ Physiol 2013, Iruretagoyena AJOG 2013

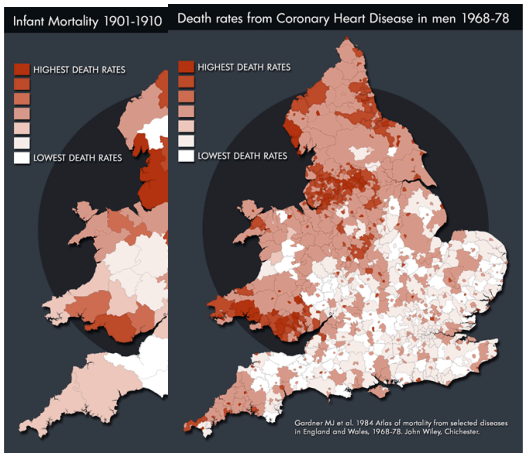
DEVELOPMENTAL ORIGINS OF CARDIOVASCULAR DISEASE



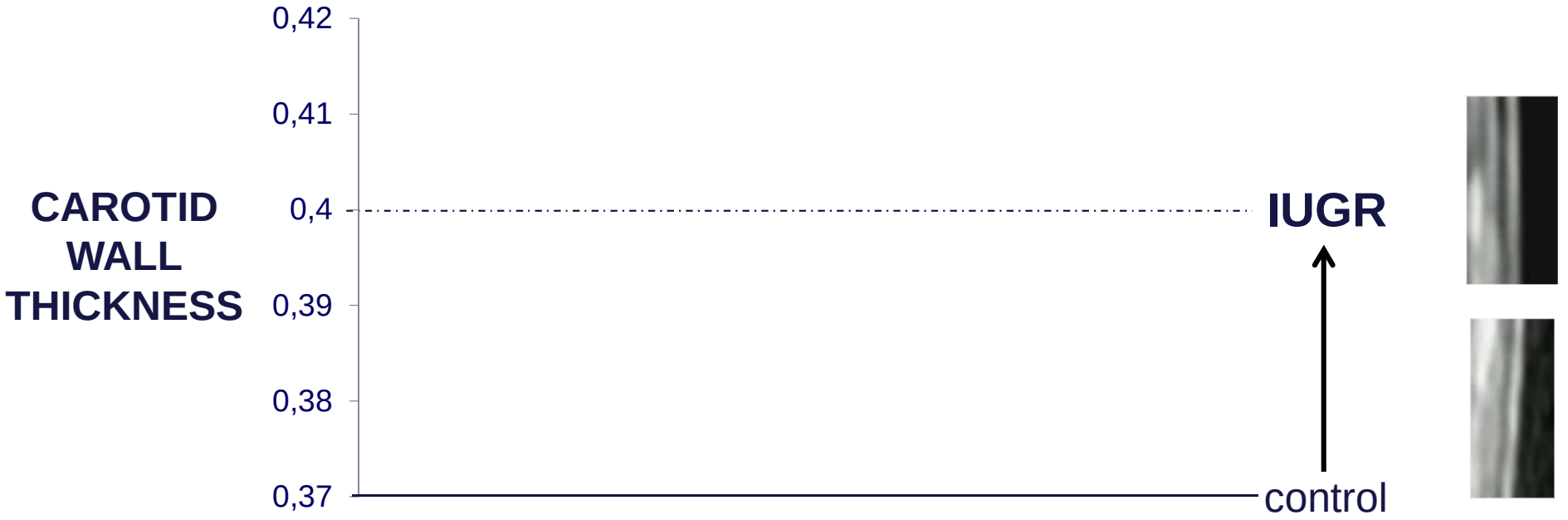
PRENATAL CHILDHOOD ADOLESCENCE ADULTHOOD



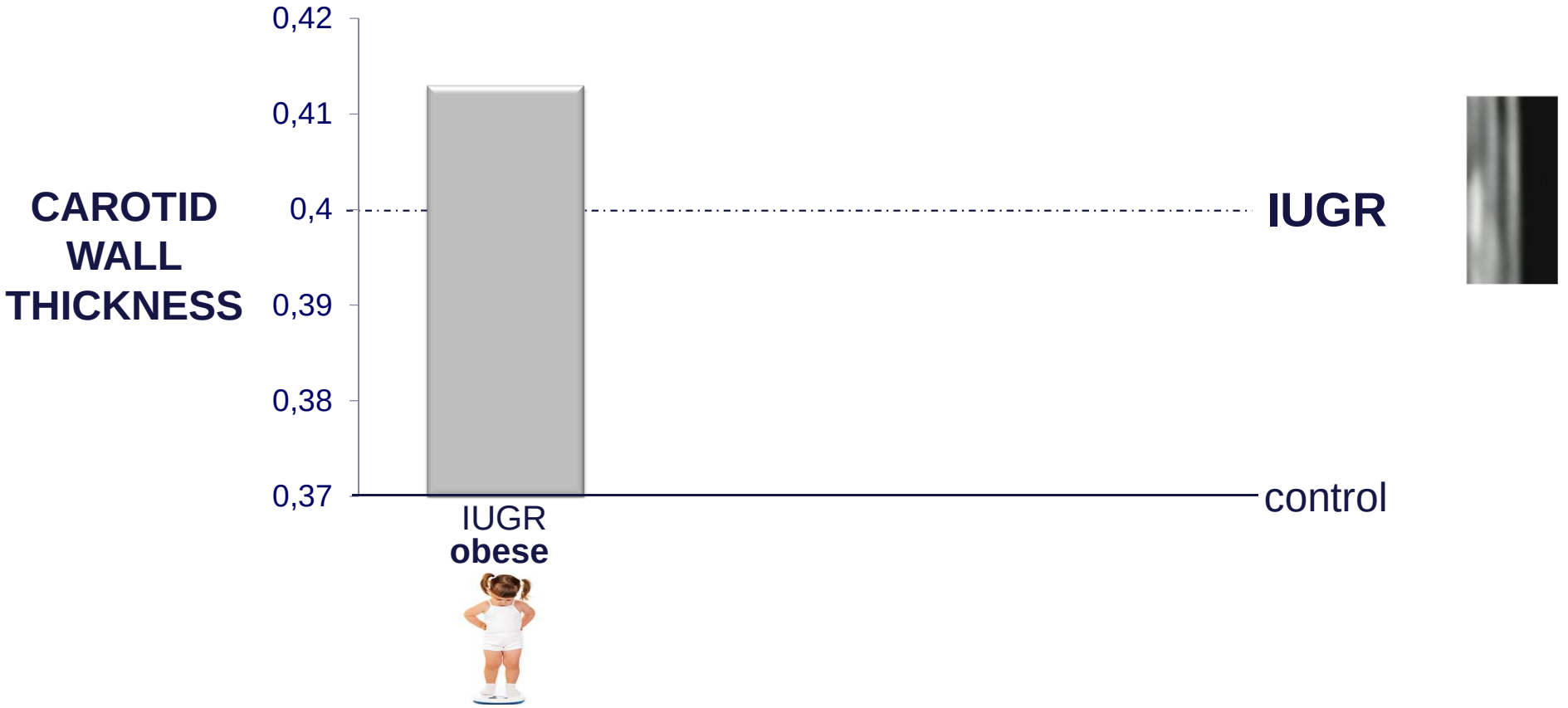




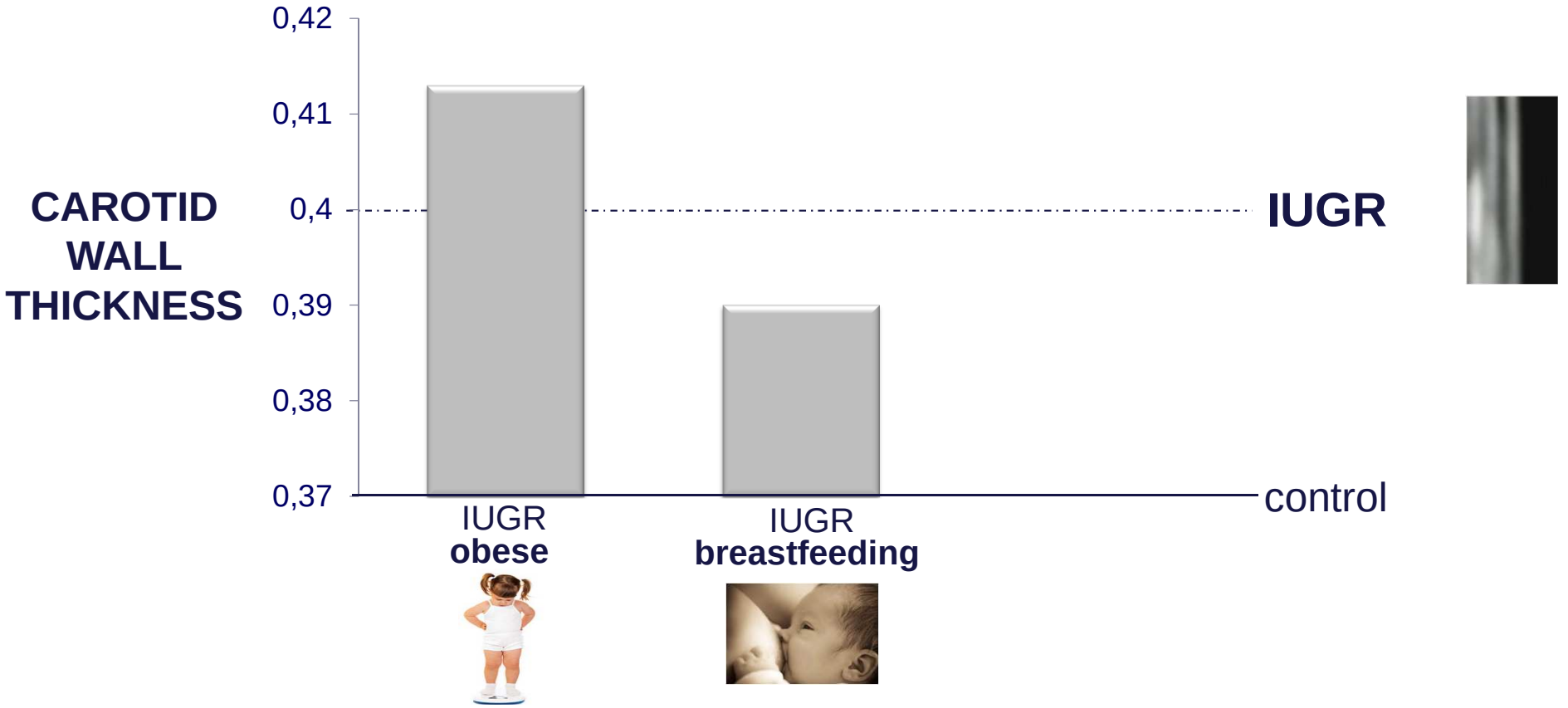
Skilton Lancet 2005,Crispi AJOG 2008, Crispi Crculation 2010, Cruz-Lemini AJOG 2013, Stergiotou UOG 2014



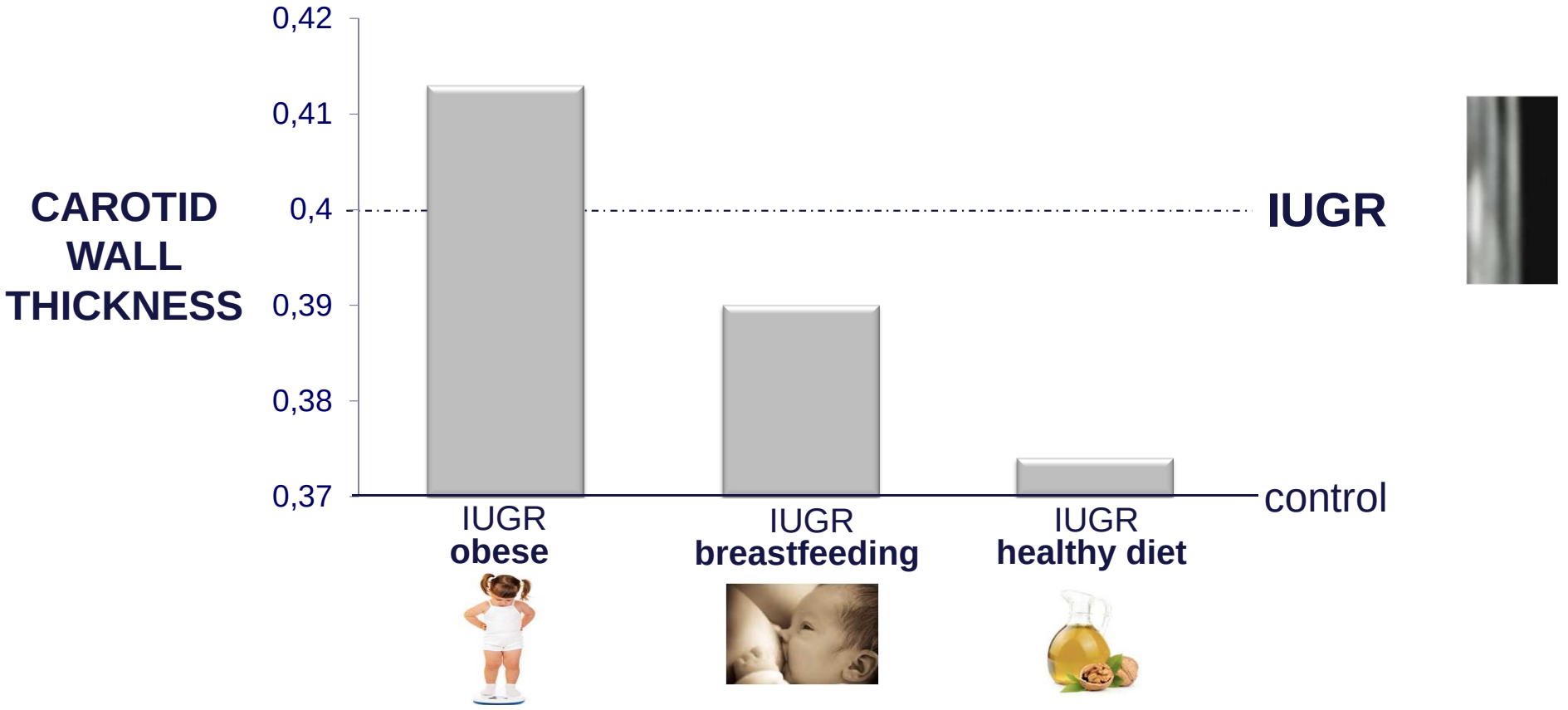
Healthy- fat intake defined as polyunsaturated/saturated fats ≥p90. Breastfeeding > 6 months. *Rodriguez-Lopez Pediatric Res 2015*



Healthy- fat intake defined as polyunsaturated/saturated fats ≥p90. Breastfeeding > 6 months. *Rodriguez-Lopez Pediatric Res 2015*

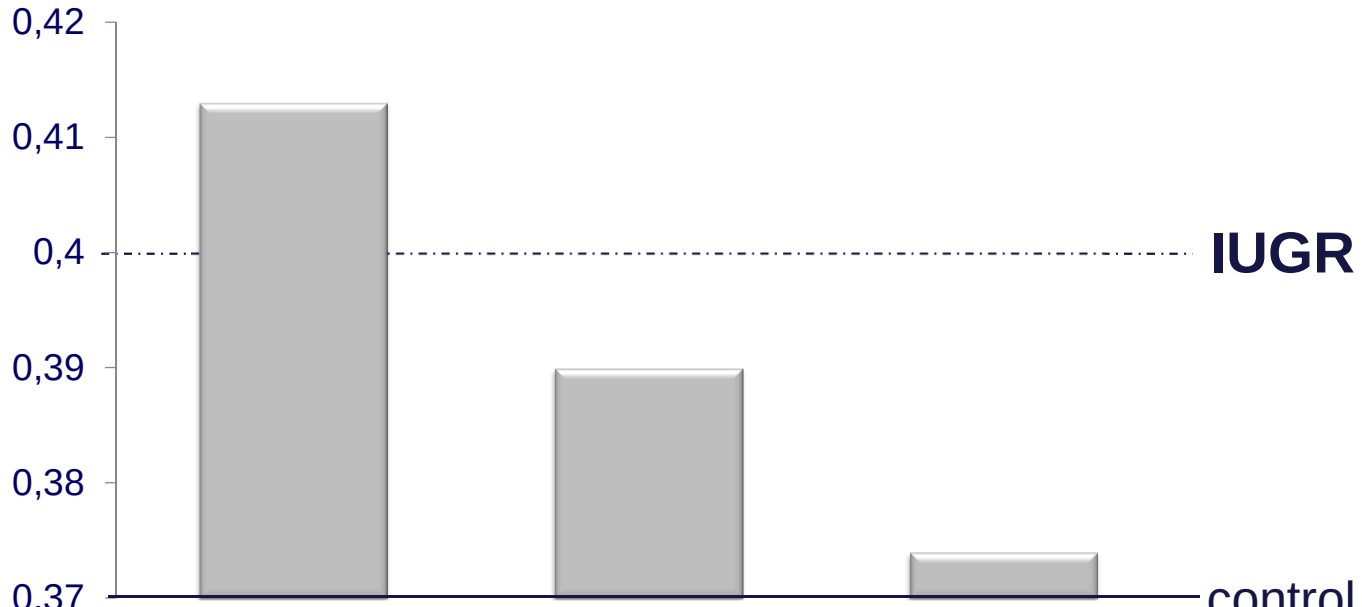


Healthy- fat intake defined as polyunsaturated/saturated fats ≥p90. Breastfeeding > 6 months. *Rodriguez-Lopez Pediatric Res 2015*



Healthy- fat intake defined as polyunsaturated/saturated fats ≥p90. Breastfeeding > 6 months. *Rodriguez-Lopez Pediatric Res 2015*

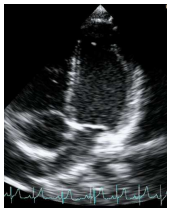
CAROTID WALL THICKNESS





CARDIAC SPHERICITY





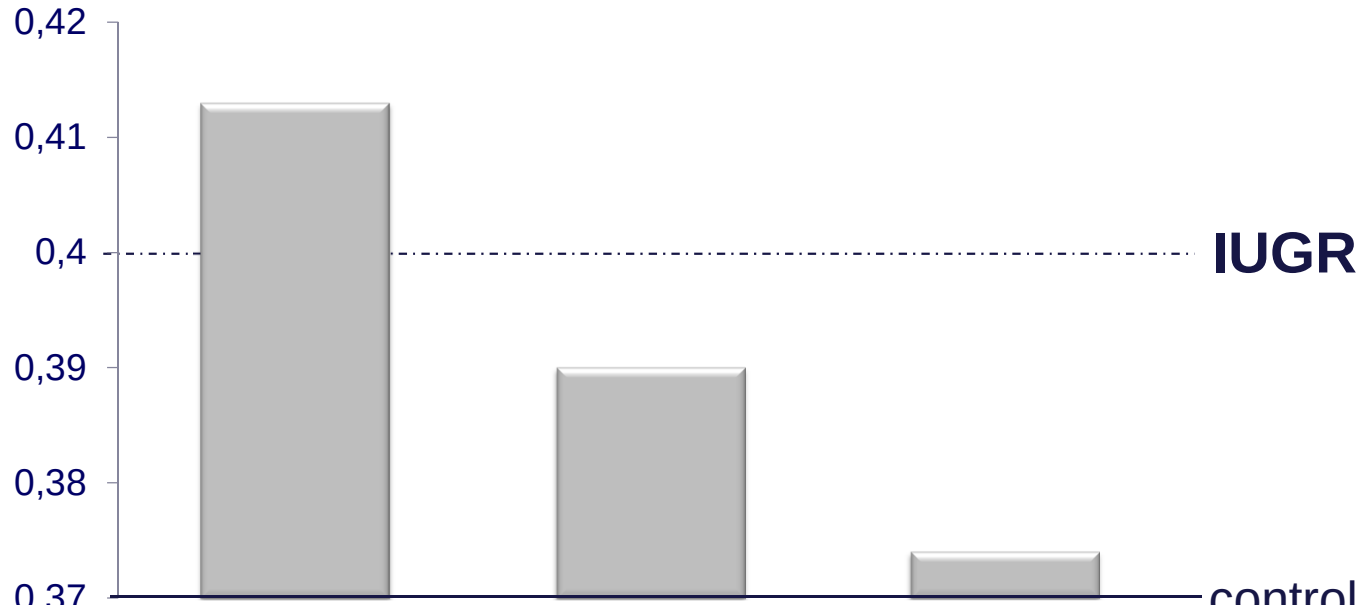


Rodriguez-Lopez Pediatric Res 2015

fetal iD

CAROTID WALL THICKNESS



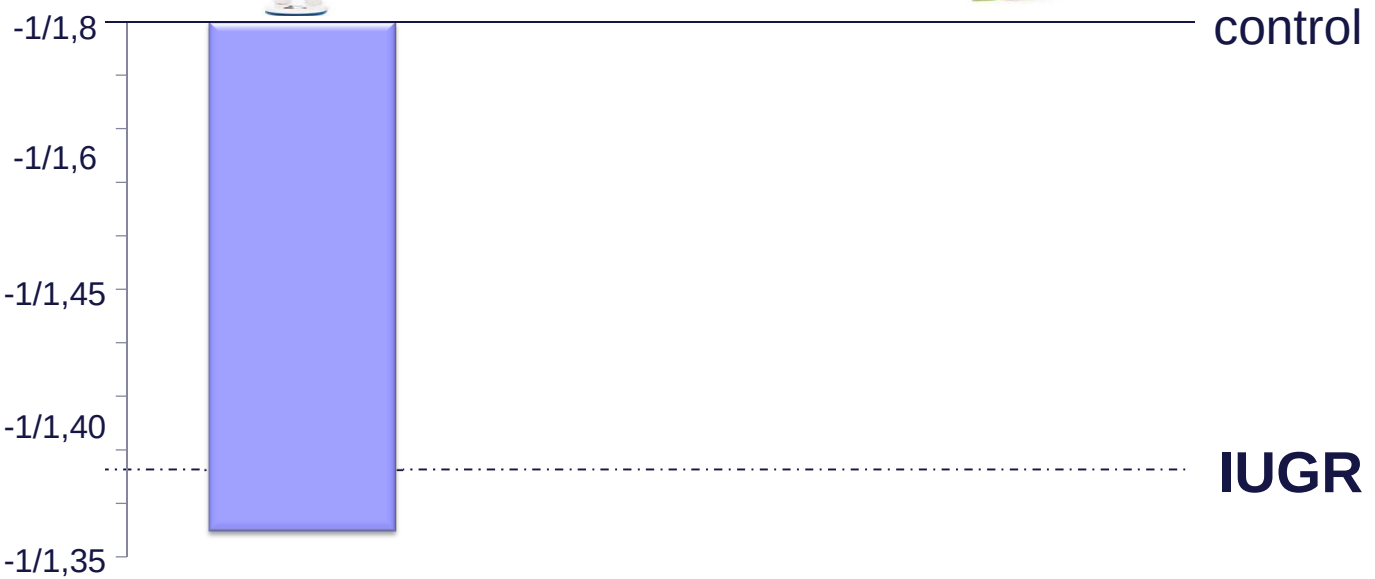








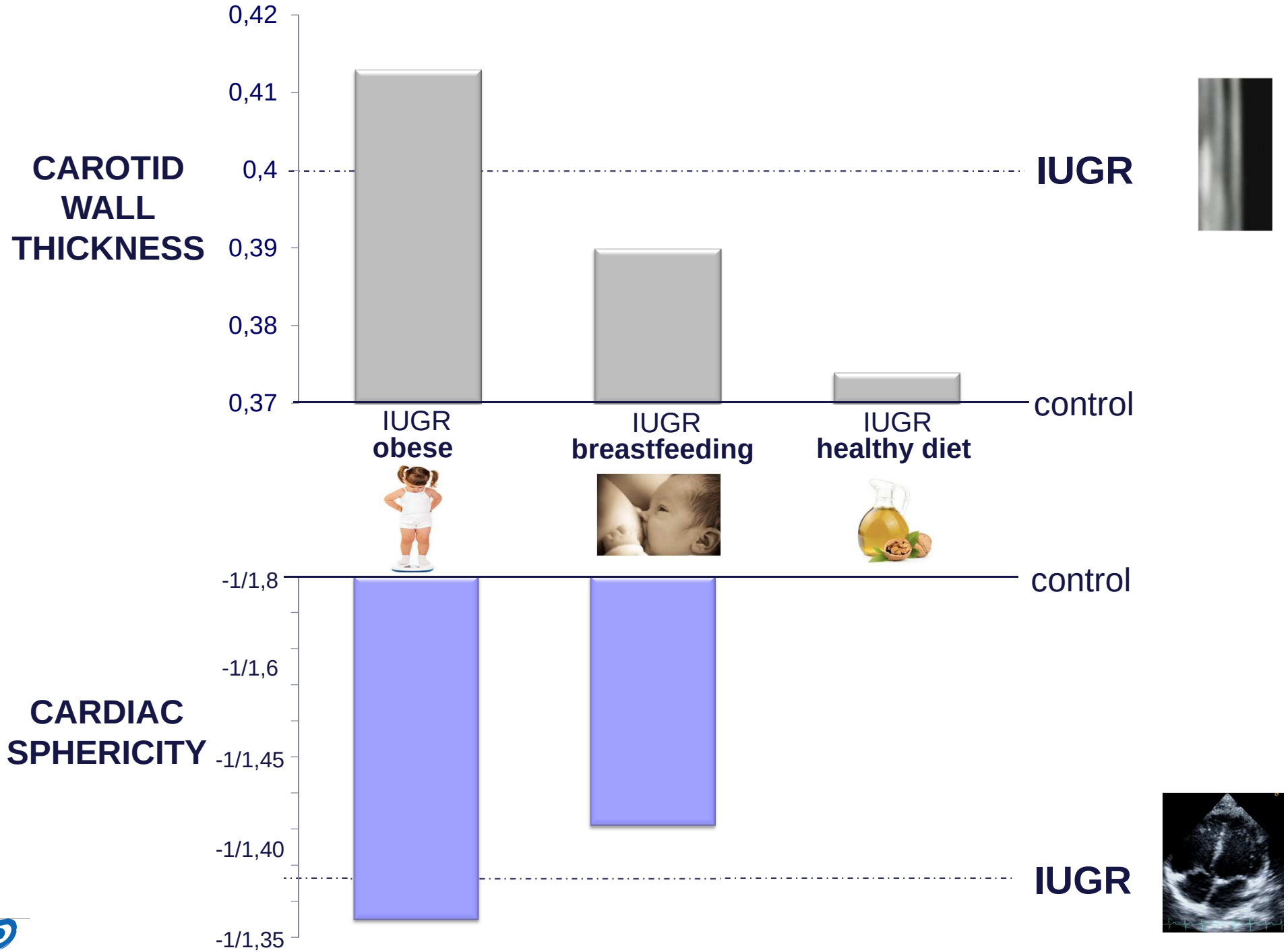
CARDIAC SPHERICITY





BC NATAL

Rodriguez-Lopez Pediatric Res 2015



Rodriguez-Lopez Pediatric Res 2015

fetal i+D

CAROTID WALL THICKNESS

0,42
0,41
0,4
0,39
0,38
0,37

IUGR

control



IUGR **obese**

IUGR **breastfeeding**

IUGR **healthy diet**







-1/1,8
-1/1,6
-1/1,45
-1/1,40
-1/1,35

control

IUGR

CARDIAC SPHERICITY



BC NATAL

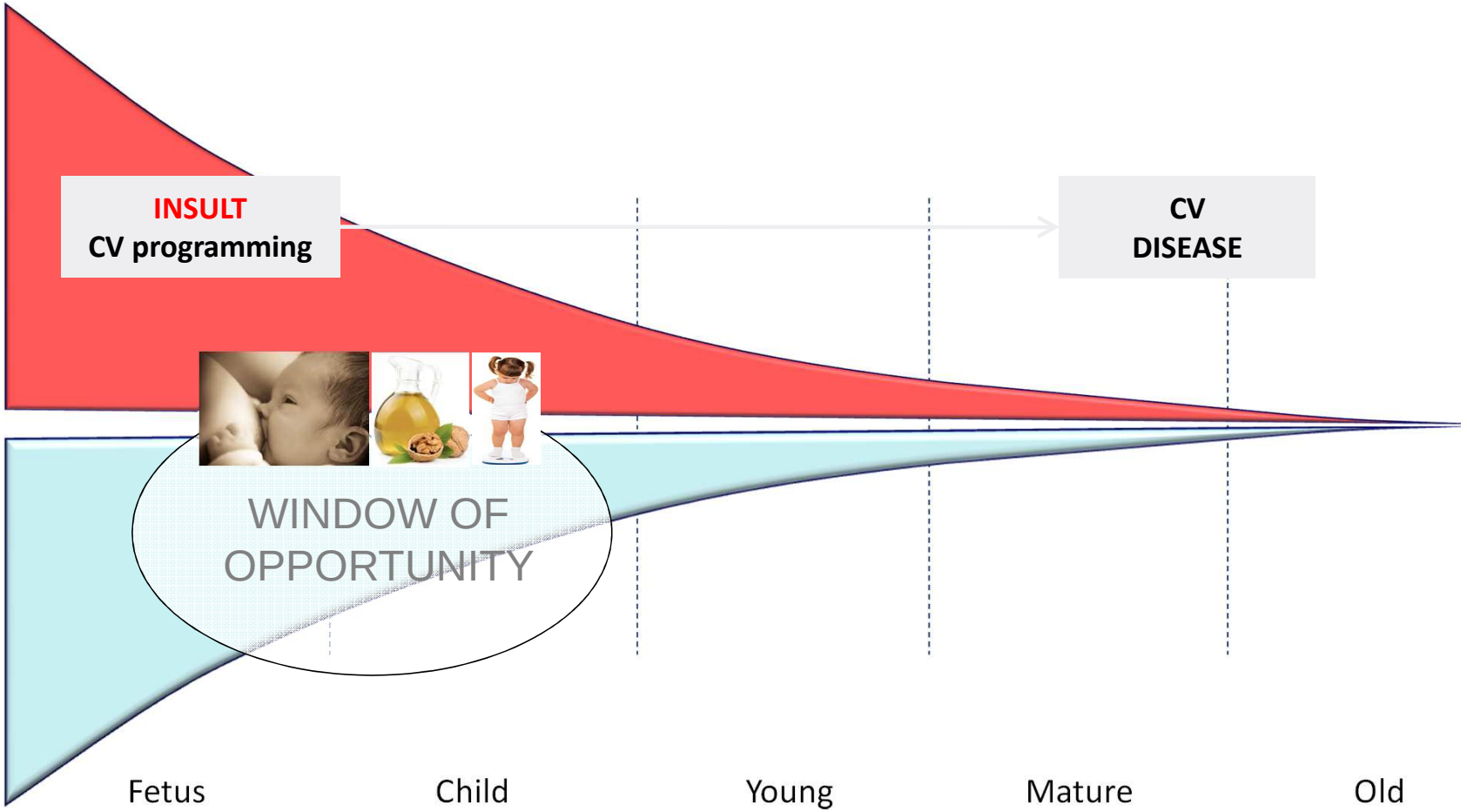
Rodriguez-Lopez Pediatric Res 2015

fetal programming

placental disease
ART
diabetes
prematurity
toxics

IMPACT OF ENVIRONMENT

OPPORTUNITY FOR CORRECTION



IDENTIFICATION OF RISK

INTERVENTION

hyperglycemia

embryo manipulation

undernutrition

toxics

hypoxia

infection

Fetal cardiovascular remodeling & programming of adult disease

Intrauterine growth restriction	Assisted reproductive technologies	Maternal diabetes	Exposure to antiretroviral drugs
			

Crispi Circulation 2010, Karatza Heart 2002, Gardiner Circulation 2003, Rychik AJOG 2007,Stirneman UOG 2010, Garcia-Otero 2015,, Valenzuela Circulation 2013



gracias

fcrispi@clinic.ub.es

www.medicinafetalbarcelona.org

GOBIERNO DE ESPAÑA
MINISTERIO DE ECONOMÍA Y COMPETITIVIDAD
Instituto de Salud Carlos III
Unión Europea
Fondo Europeo de Desarrollo Regional
"Una manera de hacer Europa"

ciberer
CENTRO DE INVESTIGACIÓN BIOMÉDICA EN RED DE ENFERMEDADES RARAS

Obra Social "la Caixa"

Cerebra
Helping brain injured children