

# DIABETIC JOURNEYS

A PROJECT FROM THE CENTER FOR NEUROSCIENCE AND CELL BIOLOGY OF THE UNIVERSITY OF COIMBRA, PORTUGAL

COORDINATION AND TEXT:  
 JOÃO RAMALHO-SANTOS E SARA VARELA AMARAL

ART:  
 ANDRÉ CAETANO

WITH THE CONTRIBUTION OF THE FOLLOWING RESEARCHERS:  
 ALEXANDRINA FERREIRA MENDES, ANA DUARTE, ANA RITA ÁLVARO, ANA TERESA VIEGAS, CLÁUDIA CAVADAS, CRISTINA CARVALHO, ERMELINDO LEAL, EUGÉNIA CARVALHO, JOÃO MOURA ALVES, JOHN JONES, LUDGERO TAVARES, MIREIA ALEMANY, NUNO EMPADINHAS, PAULA MOREIRA, PAULO J. OLIVEIRA, PEDRO GOMES, RENATA TAVARES, SANDRA AMARAL, SARA SILVA, SÓNIA CORREIA, SUSANA CARDOSO.

DIABETES IS A CHRONIC DISEASE THAT AFFECTS MILLIONS OF PEOPLE WORLDWIDE. BUT WHAT DOES IT EXACTLY ENTAIL?

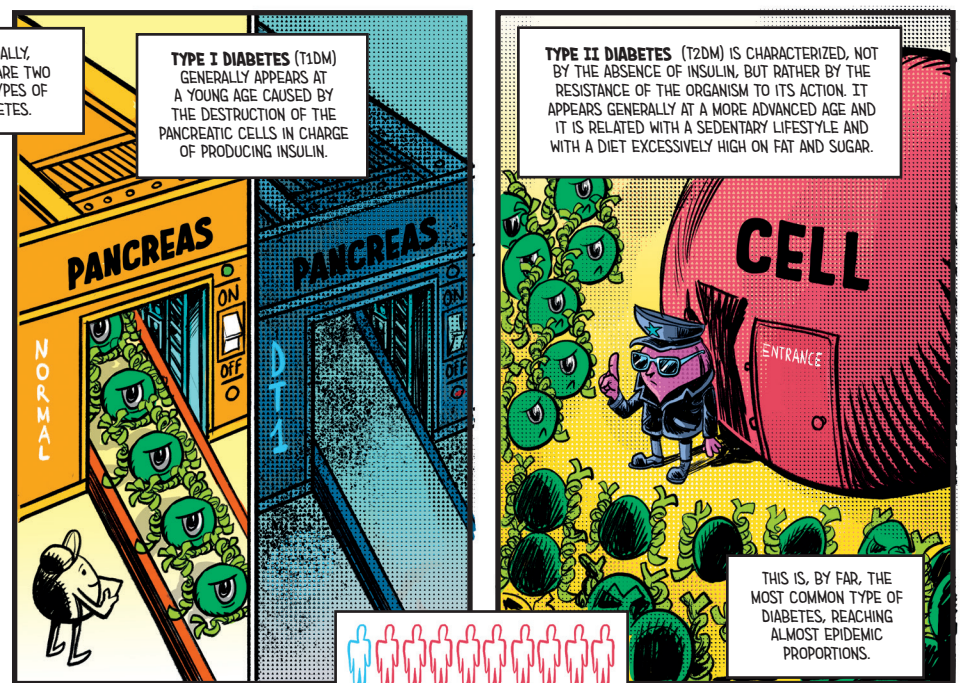
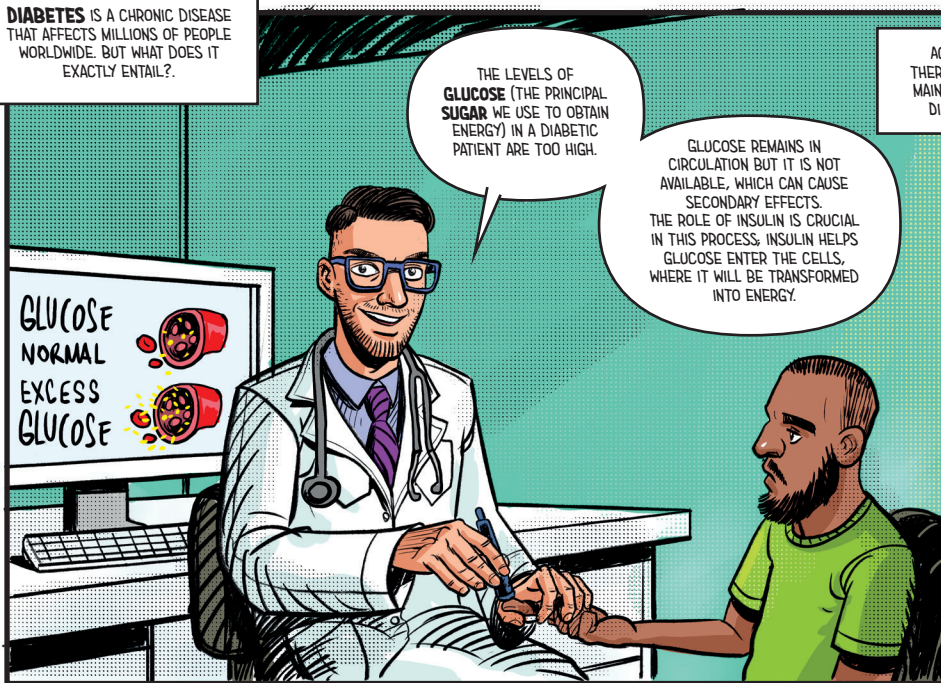
THE LEVELS OF **GLUCOSE** (THE PRINCIPAL SUGAR WE USE TO OBTAIN ENERGY) IN A DIABETIC PATIENT ARE TOO HIGH.

GLUCOSE REMAINS IN CIRCULATION BUT IT IS NOT AVAILABLE, WHICH CAN CAUSE SECONDARY EFFECTS. THE ROLE OF INSULIN IS CRUCIAL IN THIS PROCESS; INSULIN HELPS GLUCOSE ENTER THE CELLS, WHERE IT WILL BE TRANSFORMED INTO ENERGY.

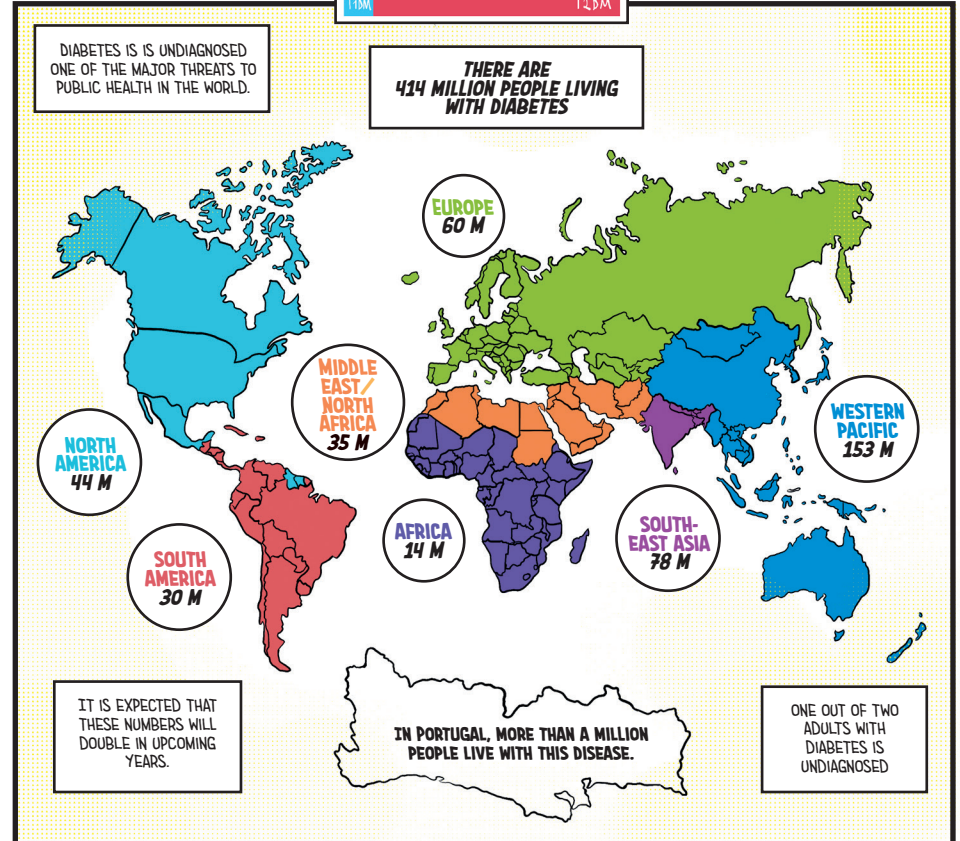
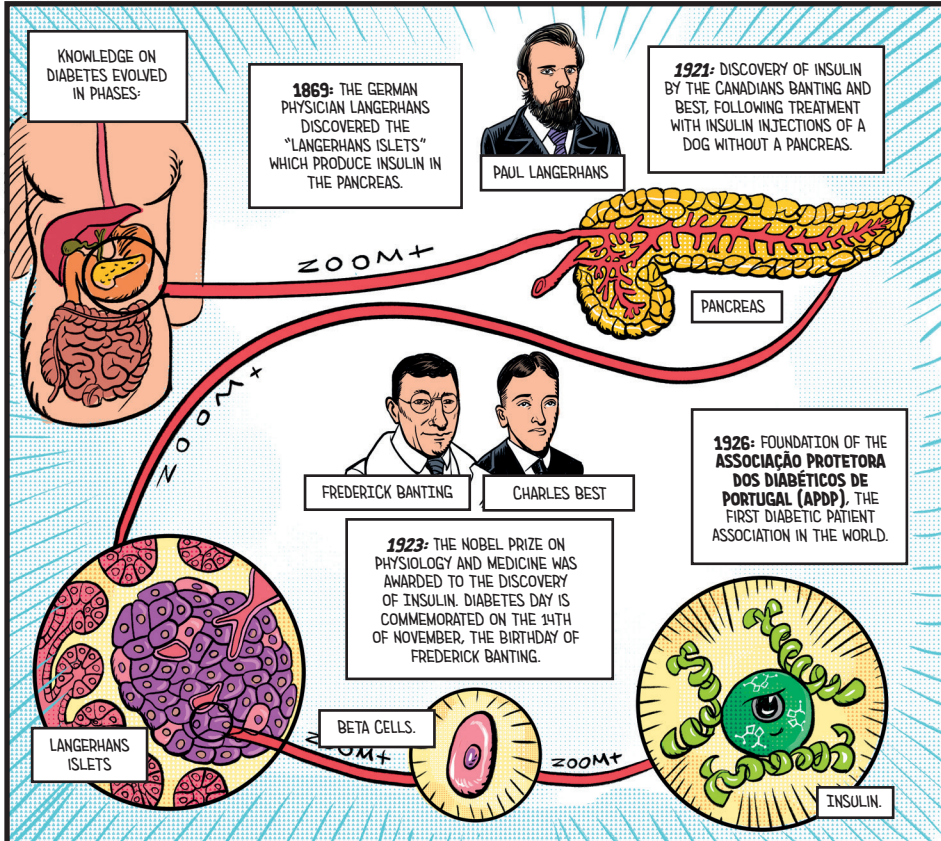
ACTUALLY, THERE ARE TWO MAIN TYPES OF DIABETES.

**TYPE I DIABETES (T1DM)** GENERALLY APPEARS AT A YOUNG AGE CAUSED BY THE DESTRUCTION OF THE PANCREATIC CELLS IN CHARGE OF PRODUCING INSULIN.

**TYPE II DIABETES (T2DM)** IS CHARACTERIZED, NOT BY THE ABSENCE OF INSULIN, BUT RATHER BY THE RESISTANCE OF THE ORGANISM TO ITS ACTION. IT APPEARS GENERALLY AT A MORE ADVANCED AGE AND IT IS RELATED WITH A SEDENTARY LIFESTYLE AND WITH A DIET EXCESSIVELY HIGH ON FAT AND SUGAR.



THIS IS, BY FAR, THE MOST COMMON TYPE OF DIABETES, REACHING ALMOST EPIDEMIC PROPORTIONS.





DIABETES HAS IMPLICATIONS IN ALMOST ALL ORGANS OF OUR BODY, CAUSING, OR EXACERBATING, DIFFERENT PATHOLOGIES.

**CNC**

**BRAIN**

INCREASED PROPENSITY TO SUFFER FROM NEURODEGENERATIVE DISEASES (LIKE ALZHEIMER'S DISEASE) AND STROKE.

COGNITIVE IMPAIRMENTS AND MEMORY.

DYSREGULATION OF APPETITE (IT AFFECTS THE NORMAL FUNCTION OF THE HYPOTHALAMUS, THE REGULATORY CENTER OF ENERGY BALANCE).

**VISION**

DIABETIC RETINOPATHY

CATARACTS

**CNC**

**RESPIRATORY SYSTEM**

SLEEP APNEA OR OTHER SLEEP DISTURBANCES INCREASE THE PREDISPOSITION TO SUFFER FROM DIABETES.

**CARDIOVASCULAR SYSTEM**

ONE OF THE MAJOR RISK FACTORS FOR THE DEVELOPMENT OF CARDIOVASCULAR DISEASES.

**CNC**

**JOINTS**

RISK FACTOR TO DEVELOP OSTEOARTHRITIS, CHARACTERIZED BY PAINFUL AND RIGID JOINTS.

**CNC**

**LIVER**

HIGHER PROBABILITY TO SUFFER HEPATIC PROBLEMS.

**KIDNEYS**

PREDISPOSITION TO RENAL FAILURE - DIABETIC NEPHROPATHY

**CNC**

**EXTREMITIES**

LOSS OF SENSITIVITY IN THE EXTREMITIES, CHRONIC INFLAMMATION AND PERIPHERAL VASCULAR DISEASE - CHRONIC WOUNDS (DIABETIC FOOT)

ALTERATIONS IN THE SKIN MICROBIOME THAT CAN LEAD TO INFECTIONS IN CHRONIC WOUNDS.

**CNC**

**REPRODUCTIVE SYSTEM**

INFERTILITY PROBLEMS IN BOTH MEN AND WOMEN. DURING PREGNANCY, DIABETES CAN HAVE SERIOUS CONSEQUENCES BOTH FOR THE MOTHER AND THE FETUS.



FROM THE DIAGNOSTIC TECHNIQUES USED BY ANCIENT EGYPTIANS UP UNTIL NOW, THE KNOWLEDGE ON DIABETES HAS EVOLVED DRAMATICALLY.

THERE ARE ALSO PHARMACOLOGICAL AND CELLULAR STRATEGIES TO CONTROL TYPE II DIABETES, NAMELY WITH INCREASED ACTIVITY OF MITOCHONDRIA (THE POWERHOUSES OF OUR CELLS), OR THE MINIMIZATION OF DAMAGE CAUSED TO THE DIFFERENT ORGANS.

FOR INSTANCE, RESEARCHIN BIOMARKERS IN URINE OR SALIVA HELPS IDENTIFY PEOPLE AT RISK, ALLOWING FOR PREVENTIVE INTERVENTIONS. THERE ARE ALSO PHARMACOLOGICAL AND CELLULAR STRATEGIES TO CONTROL TYPE II DIABETES, NAMELY WITH INCREASED ACTIVITY OF MITOCHONDRIA (THE CELLULAR POWERHOUSES), OR MINIMIZING DAMAGE CAUSED TO THE DIFFERENT ORGANS.

HOWEVER, THE MOST EFFICIENT THERAPY CONSISTS OF FOLLOWING A HEALTHY DIET, REGULAR PHYSICAL EXERCISE, AND ADOPTING GOOD SLEEP HABITS, TOGETHER WITH EDUCATIONAL AND AWARENESS INITIATIVES.



YOU DON'T NEED TO BE A SCIENTIST TO CONTRIBUTE EFFECTIVELY IN FIGHTING DIABETES AND IMPROVING HEALTH ISSUES IN THE POPULATION.

AND WHO KNOWS, MAYBE EVENTUALLY IT WILL NO LONGER BE NECESSARY TO CELEBRATE THIS DAY.

