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CENTER FOR NEUROSCIENCE AND CELL BIOLOGY
UNIVERSITY OF COIMBRA, PORTUGAL

DIABETIC JOURNEYS

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

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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.

GLUCOSE
NORMAL
EXCESS GLUCOSE

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.

PANCREAS
NORMAL
ON
OFF
PANCREAS
DT1

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.

CELL
ENTRANCE

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

DT1 DT2

KNOWLEDGE ON DIABETES EVOLVED IN PHASES:

1869: THE GERMAN PHYSICIAN LANGERHANS DISCOVERED THE "LANGERHANS ISLETS" WHICH PRODUCE INSULIN IN THE PANCREAS.

PAUL LANGERHANS

1921: DISCOVERY OF INSULIN BY THE CANADIANS BANTING AND BEST, FOLLOWING TREATMENT WITH INSULIN INJECTIONS OF A DOG WITHOUT A PANCREAS.

ZOOM+

PANCREAS

ZOOM+

FREDERICK BANTING

CHARLES BEST

1926: FOUNDATION OF THE **ASSOCIAÇÃO PROTETORA DOS DIABÉTICOS DE PORTUGAL (APDP)**, THE FIRST DIABETIC PATIENT ASSOCIATION IN THE WORLD.

1923: THE NOBEL PRIZE ON PHYSIOLOGY AND MEDICINE WAS AWARDED TO THE DISCOVERY OF INSULIN. DIABETES DAY IS COMMEMORATED ON THE 14TH OF NOVEMBER, THE BIRTHDAY OF FREDERICK BANTING.

LANGERHANS ISLETS

BETA CELLS.

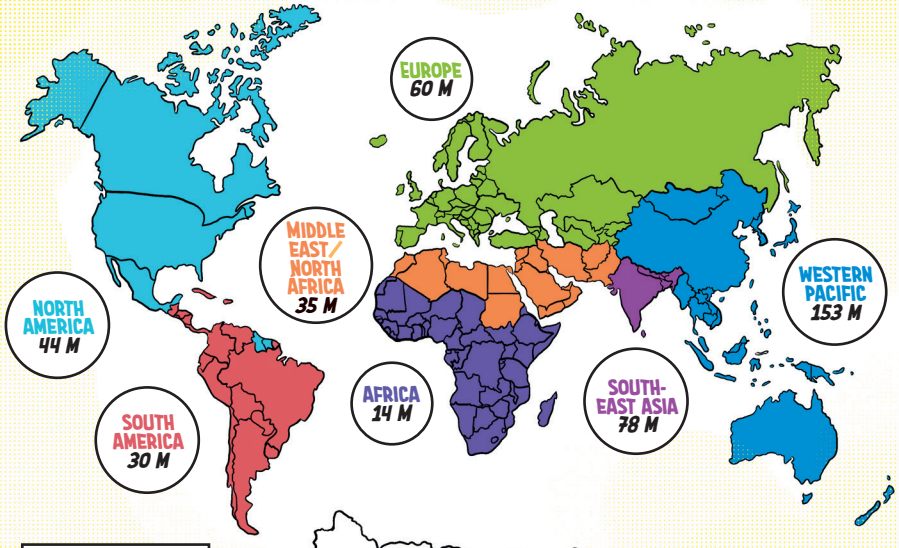
ZOOM+

ZOOM+

INSULIN.

DIABETES IS NOWADAYS ONE OF THE MAJOR THREATS TO PUBLIC HEALTH IN THE WORLD.

THERE ARE 414 MILLION PEOPLE LIVING WITH DIABETES

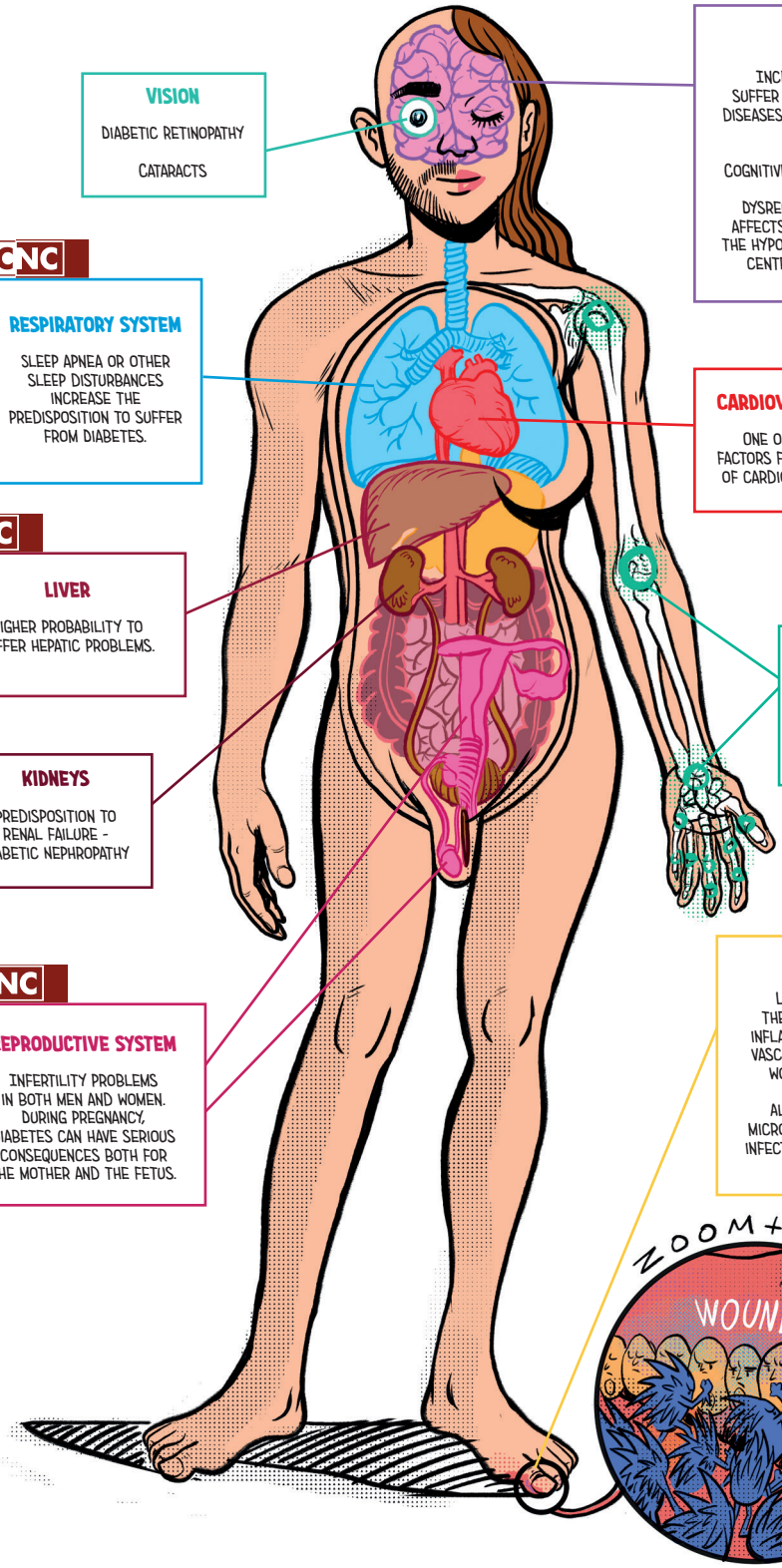


IT IS EXPECTED THAT THESE NUMBERS WILL DOUBLE IN THE UPCOMING YEARS.

IN PORTUGAL, MORE THAN A MILLION PEOPLE LIVE WITH THIS DISEASE.

ONE OUT OF TWO ADULTS WITH DIABETES NIS NOT DIAGNOSED.

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



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VISION

DIABETIC RETINOPATHY

CATARACTS

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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).

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RESPIRATORY SYSTEM

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

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CARDIOVASCULAR SYSTEM

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

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LIVER

HIGHER PROBABILITY TO SUFFER HEPATIC PROBLEMS.

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JOINTS

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

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KIDNEYS

PREDISPOSITION TO RENAL FAILURE - DIABETIC NEPHROPATHY

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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.

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REPRODUCTIVE SYSTEM

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

ZOOM+

WOUND

K.O.!