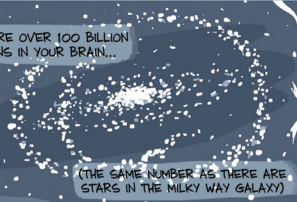


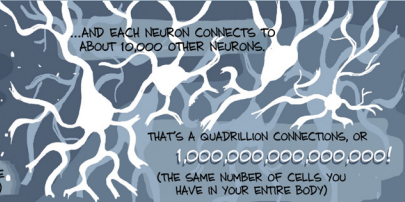
# brain DEVELOPMENT

by DWAYNE GODWIN AND JORGE CHAM

THERE ARE OVER 100 BILLION NEURONS IN YOUR BRAIN...



...AND EACH NEURON CONNECTS TO ABOUT 10,000 OTHER NEURONS.



THAT'S A QUADRILLION CONNECTIONS, OR 1,000,000,000,000,000!

(THE SAME NUMBER OF CELLS YOU HAVE IN YOUR ENTIRE BODY)

HOW DOES SUCH A COMPLEX NETWORK DEVELOP??



WELL, IT ALL STARTS WHEN YOU'RE ABOUT 4 WEEKS OLD...

You.

A NARROW GROOVE BEGINS TO FORM ON YOUR NASCENT GROUP OF CELLS, GIVING THE FIRST HINT OF A NERVOUS SYSTEM:

THE GROOVE THEN FOLDS INTO ITSELF, FORMING WHAT IS CALLED THE NEURAL TUBE.

THE TUBE THEN SQUEEZES IN VARIOUS SECTIONS TO FORM THE DIFFERENT PARTS OF THE BRAIN AND THE SPINAL CORD:



NEW NEURONS ARE MADE IN AN AREA DEEP INSIDE THE GROWING BRAIN CALLED THE VENTRICULAR ZONE...



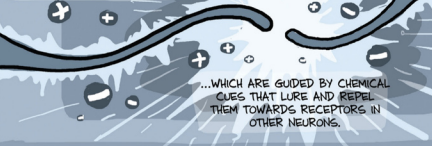
...AND THEN TRAVEL OUTWARDS BY CLIMBING ALONG CELLULAR "ROPES" CALLED "RADIAL GLIA".



THEY EVENTUALLY SETTLE INTO SIX DISTINCT LAYERS OF NEURONS THAT MAKE UP YOUR BRAIN CORTEX.



ONCE IN PLACE, NEURONS REACH OUT TO EACH OTHER BY EXTENDING TENTACLE-LIKE "GROWTH CONES"...



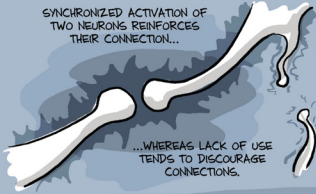
BUT IT'S NOT ALL GENETIC.



...WHICH ARE GUIDED BY CHEMICAL CUES THAT LURE AND REPEL THEM TOWARDS RECEPTORS IN OTHER NEURONS.

NEURON CONNECTIONS ARE ALSO DETERMINED BY ACTIVITY PATTERNS, WHICH IS WHAT MAKES EACH BRAIN SO UNIQUE.

SYNCHRONIZED ACTIVATION OF TWO NEURONS REINFORCES THEIR CONNECTION...



...WHEREAS LACK OF USE TENDS TO DISCOURAGE CONNECTIONS.

THIS IS WHY ALCOHOL IS SO HARMFUL TO DEVELOPING BRAINS.



IT NOT ONLY DISRUPTS THE GENES INVOLVED IN DEVELOPMENT, BUT ALSO AFFECTS THE CHEMICALS THAT TRANSMIT SIGNALS BETWEEN NEURONS.



EVEN AFTER BIRTH, OUR BRAINS ARE STILL IN THE PROCESS OF WIRING THEMSELVES AND CAN BE INFLUENCED BY THE WORLD AROUND US.



FOR EXAMPLE, CATS RAISED IN AN ENVIRONMENT OF VERTICAL STRIPES...



...LATER HAVE TROUBLE SEEING HORIZONTAL STRIPES!



ALSO, DIFFERENT PARTS OF THE BRAIN DEVELOP AT DIFFERENT RATES.



FOR EXAMPLE, THE FRONTAL LOBES (WHERE JUDGEMENT AND DECISION-MAKING HAPPENS) ARE STILL IN DEVELOPMENT DURING OUR TEENAGE YEARS...



...WHICH MIGHT EXPLAIN A LOT.

WHAT WERE YOU WEARING?!



YOU MIGHT NOT FEEL ANY SMARTER, BUT YOUR BRAIN IS STILL GROWING AND REARRANGING ITSELF, EVEN AS AN ADULT (THOUGH NOT AS FAST AS IN THE WOMB)

SO REMEMBER TO MAINTAIN AN ELEMENT OF SURPRISE AND WONDER ABOUT THE WORLD AROUND YOU. YOUR BRAIN NEEDS IT!

