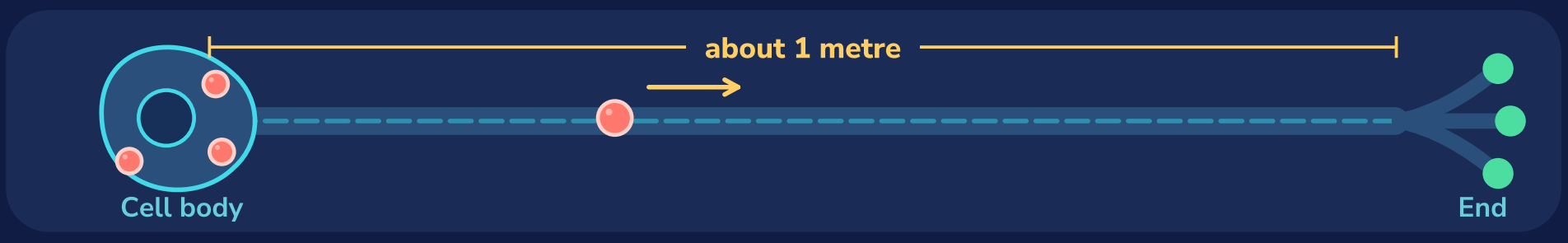
# If its step were a metre long, it would walk at 360 km an hour.

A transport protein made by the cell carries loads step by step along a thin track.

DuaMio
DISCOVER

## 1 Problem: made in the body, needed at the end

Some nerve cells are about a metre long: a single cell, more than half your height.
**Many loads are made in the cell body, but they are needed at the far end of the extension.**




## 2 If it went on its own: centuries

It would spread on its own, like ink dripping into water. But if the road is twice as long, the wait is four times as long.



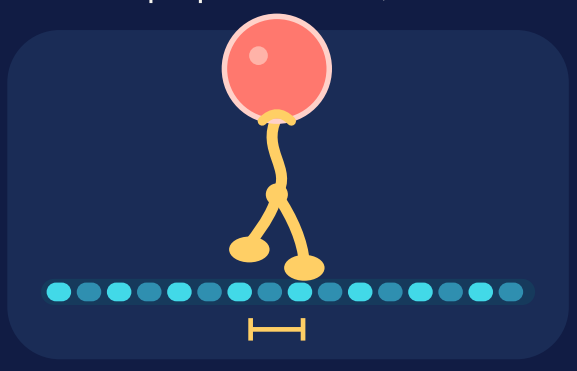
**1 cm: about two weeks**

**1 m: centuries**

A rough calculation for a protein, not a measured time.

## 3 Solution: a courier walking on a track

It swings its two ends forward in turn. Enlarge only its step, not its body, to a metre: at its lab pace of about 100 steps per second, that is about 360 km an hour.



**Real step: about 8 nanometres**

**More than six thousand steps across a hair**

**1 metre: about 125 million steps**

No single courier runs a marathon: in the lab a typical walk is about a hundred steps. Several couriers can hold one load; in one model the load changes hands along the way.

## 4 But not every load is in a hurry

Some sacs · about 5-40 cm a day

**1 metre: a few days to a few weeks**

Building blocks of the tracks and some skeleton threads · about 0.2-1 mm a day

**1 metre: close to three years to more than ten**

Calculated from speeds in animal studies.



The nerve cells in your cerebral cortex are largely the same age as you, but the parts inside them can be renewed.

**The building stays the same; the furniture inside changes.**

Every step of this small journey opens a door to reflecting on Allah’s knowledge and power.

Discover, marvel, remember the Creator.

Sources: Milo & Phillips 2015 · Roy 2014 · Blasius 2013 · Yildiz 2004 · Bhardwaj 2006

www.duamio.com

Math: 100 steps/s × 1 m = 360 km/h; 1 m ÷ 8 nm = 125 million.
Drawings are illustrative, not to scale.