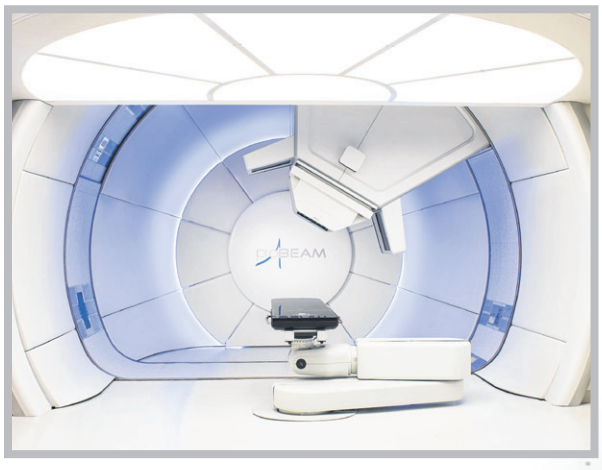
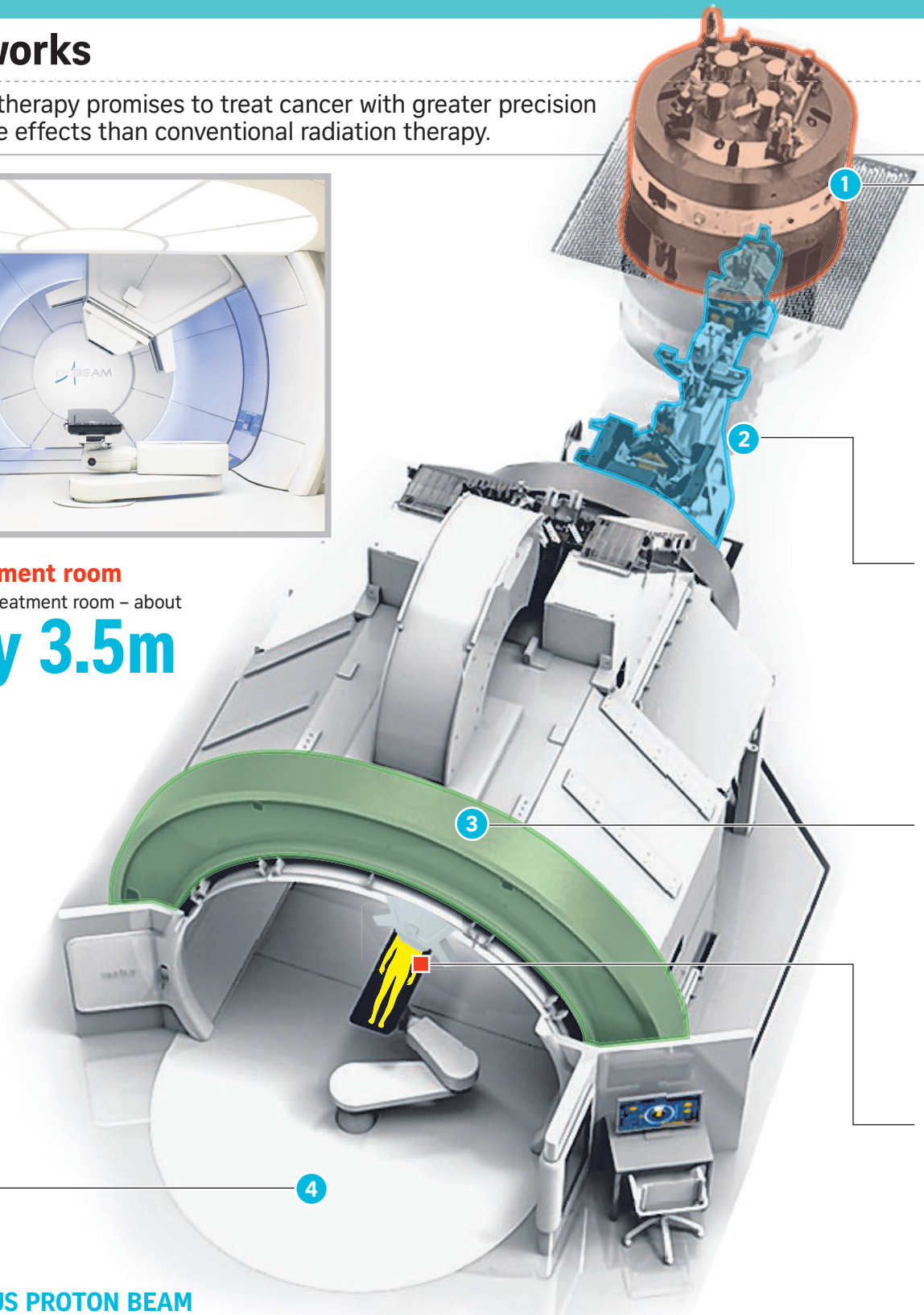
How it works

Proton beam therapy promises to treat cancer with greater precision and fewer side effects than conventional radiation therapy.





Superconducting cyclotron

- A particle accelerator that uses electromagnetic waves to accelerate protons (subatomic particles) to 60 per cent of the speed of light.
- Its energy capabilities allow for dose delivery to deep-seated tumours, offering the broadest energy treatment range available.

Beam transport system

- Focuses and shapes the beam and guides it to the treatment room, creating the small beam size necessary for clinicians to target very small spots with varying levels of intensity.

360-degree rotating gantry

- Rotates 190 degrees in each direction, offering 360-degree treatment rotations around the patient.
- This allows treatment at any angle while minimising the need to reposition the patient.
- It is easier for the patient, and allows faster, more efficient treatment times than other proton delivery solutions.

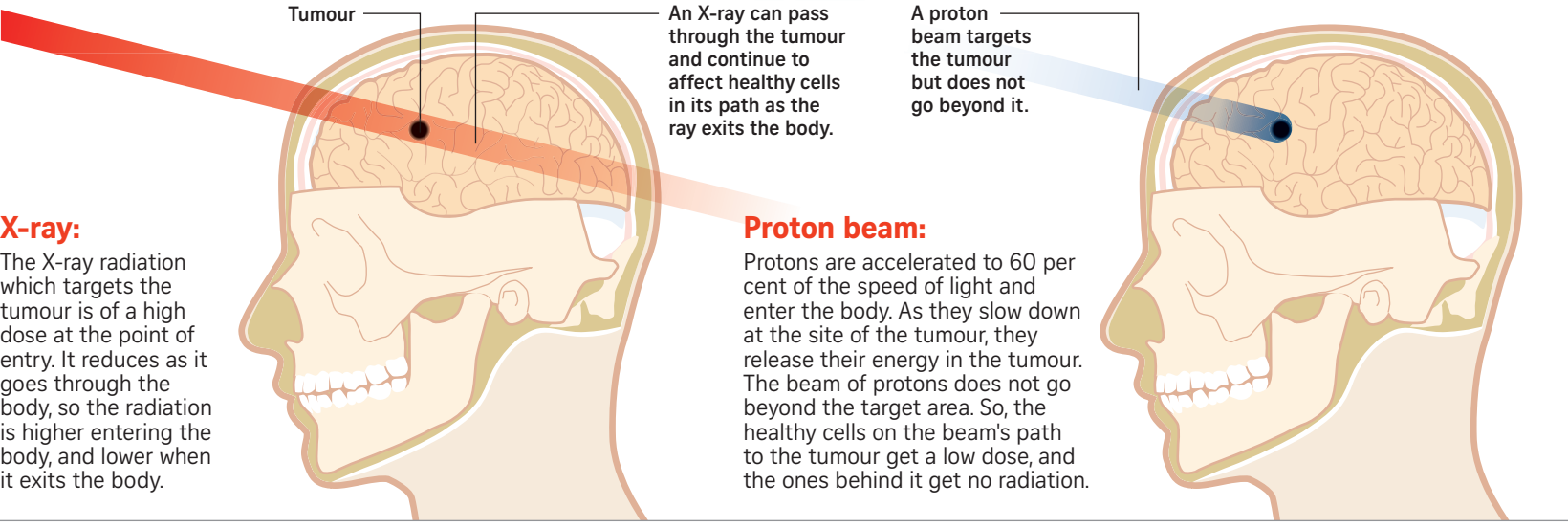
- The sophisticated patient positioning system moves in all directions.
- Uses a thin "pencil beam" to outline and "fill in" the region with the tumour, somewhat akin to 3D printing, to enable precise dose delivery.

Patient treatment room

- The cylindrical treatment room – about

5m by 3.5m

X-RAY VERSUS PROTON BEAM FOR BRAIN TUMOUR TREATMENT



X-ray:

The X-ray radiation which targets the tumour is of a high dose at the point of entry. It reduces as it goes through the body, so the radiation is higher entering the body, and lower when it exits the body.

Proton beam:

Protons are accelerated to 60 per cent of the speed of light and enter the body. As they slow down at the site of the tumour, they release their energy in the tumour. The beam of protons does not go beyond the target area. So, the healthy cells on the beam's path to the tumour get a low dose, and the ones behind it get no radiation.

Sources: VARIAN MEDICAL SYSTEMS PACIFIC, NATIONAL CANCER CENTRE SINGAPORE PHOTOS: VARIAN MEDICAL SYSTEMS PACIFIC STRAITS TIMES GRAPHICS