

Be like Spiderman with new Gecko Tape

A) Most of us are familiar with Marvel Comic's superhero Spiderman and his ability to walk up and down the walls of buildings, or even cross ceilings. Now a team of Anglo-Russian researchers, working mainly from the University of Manchester in the U.K, have come up with what could be a dream for children and a nightmare for their parents: "gecko" tape, which copies the incredible stickiness of a gecko lizard's feet and could allow people to climb, superhero-style, on ceilings and walls.

B) Geckos can dangle their whole body weight from a wall by one single toe. They can move themselves up a sheet of glass at the amazing speed of one metre per second. A team of U.S. biologists and engineers released a study last summer which explained how this is possible. The soles of the gecko's feet are coated with millions of microscopic hairs, or setae. Each seta has 1,000 tiny pads on its tip, a tip that is so small it is below the wavelength of visible light, only 200 billionths of a metre wide. Each seta creates a tiny force of electro-dynamic attraction when it comes into contact with a surface (this kind of force of attraction and repulsion existing between molecules was discovered over 100 years ago by Johannes Van der Waals). When all the setae on a gecko's feet make contact, the combined adhesive force is incredibly strong, with the added benefit that its feet can be peeled away from the surface at any time to allow it to move one leg at a time. It seems to be the size and shape of the foot hairs that enable adherence to a surface, not their actual structure.

C) The same principle has been used in Manchester to make self-cleaning, re-attachable dry adhesive tape. If used to cover a person's hands, it would easily be sticky enough to support their full weight. The research team believes it won't be long before 'Spiderman' gloves become a reality. A biology professor at the University of California said that the uses for such a product would be "almost unlimited": as well as being an extraordinary general adhesive, it can be used to move computer chips in a vacuum, pick up small fibres, and make specialised bandages. "It's like Velcro without the need for 2 sides." he said.

D) Gecko-glue has even interested the U.S. military. The central research and development organization for the Pentagon has funded some research, though it has not revealed any plans it might have for it.

Give a short answer NO MORE THAN THREE WORDS to the following questions.

- (1) Which group of people may not be happy with 'gecko tape'?
- (2) What are setae?
- (3) What kind of force is produced when a seta touches a surface?
- (4) What aspects of setae allow them to stick to a surface?
- (5) What product from the research into adhesives could be used by hospitals?