

## #MICROORGANISMS

### Microbes Taking Over Your Teeth

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**A** cross-kingdom partnership between bacteria and fungi can result in the two joining to form a "super-organism" with unusual strength and resilience that can effectively colonize teeth, according to new research.

It may sound like the stuff of science fiction, but these microbial groupings, found in the saliva of toddlers with severe childhood tooth decay, are very much part of the here and now.

The assemblages are stickier, more resistant to antimicrobials, and more difficult to remove from teeth than either the bacteria or the fungi alone, the researchers report.

What's more, the assemblages unexpectedly sprout "limbs" that propel them to "walk" and "leap" to quickly spread on the tooth surface, despite each microbe on its own being non-motile, the team reports in the Proceedings of the National Academy of Sciences.

"This started with a very simple, almost accidental discovery, while looking at saliva samples from toddlers who develop aggressive tooth decay," says corresponding author Hyun (Michelle) Koo, a professor in the orthodontics department at the University of Pennsylvania.

"Looking under the microscope, we noticed the bacteria and fungi forming these assemblages and developing motions we never thought they would possess: a 'walking-like' and 'leaping-like' motility. They have a lot of what we call 'emergent functions' that bring new benefits to this assemblage that they could not achieve on their own. It's almost like a new organism—a super-organism—with new functions."

**Assemblages**  
In the past, Koo's lab has focused on the dental biofilm, or plaque, present in children with severe tooth decay, discovering that both bacteria *Streptococcus mutans* and fungi *Candida albicans* contribute to the disease. Caries, commonly known as cavities, arise when sugars in the diet linger to feed bacteria and fungi in the mouth, leading to acid-producing dental plaque that destroys enamel.

The new set of discoveries came about when first author Zhi Ren, a postdoctoral fellow in Koo's group, was using microscopy that allows scientists to visualize the behaviour of living microbes in real time. After seeing the bacterial-fungal clusters present in the

saliva samples, Ren, Koo, and colleagues were curious how the groupings might behave once attached to the surface of a tooth. They began a series of experiments using real-time live microscopy to observe the process of attachment and eventual growth.

They created a laboratory system to recreate the formation of these assemblages, using the bacteria, fungi, and a tooth-like material, all incubated in human saliva. The platform enabled the researchers to watch the groupings come together and to analyse the structure of the resulting assemblages. They found a highly organized structure with bacterial clusters attached in a complex network of fungal yeast and filament-like projections called hyphae, all enmeshed in an extracellular polymer, a glue-like material.

During the freedom struggle and soon after independence, Congress has witnessed some high profile contest involving stalwarts. Compared to those epic battles, the later ones were propelled by ego and push for control.

This 1950 contest was viewed as a Sardar Patel Vs Jawahar Lal Nehru battle as the latter vehemently opposed Tandon's candidature saying he represented the 'Right' and Hindu conservatism. With Patel standing firm with Tandon and Nehru

with Kripalani, the contest led to Tandon's victory. But Nehru refused to back off and even threatened to quit CWC. Patel's untimely death within months changed equations, and this forced Tandon to quit, and PM Nehru become Congress president too.

## #CONGRESS PRESIDENT ELECTION

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**M**allikarjun Kharge and Shashi Tharoor are up against each other for Congress presidential contest, the battle is special as it marks the prospect, although only technically, of a non-Gandhi party chief since 1988.

With the support of Gandhi – Vajra led Congress establishment over Kharge's candidature, although the family's projected 'neutrality', the curiosity that remains is only whether Tharoor will lose as badly as some of the previous contestants or he will notch up decent votes.

The choreography of the selection / nomination of Kharge left none in doubt that the Gandhi – Vajra trio - that led Congress to its worst two Lok Sabha poll defeats, with the party regimes now limited to Rajasthan and Chhattisgarh- and their nominated colleagues / delegates are determined to maintain their hold on the party.

Next the team tested the properties of these cross-kingdom assemblages once they had colonized the tooth surface and found 'surprising behaviours and emergent properties,' says Ren, "including enhanced surface adhesion, making them very sticky, and increased mechanical and antimicrobial tolerance, making them tough to remove or kill."

Perhaps the most intriguing characteristic of the assemblages, the researchers say, is their motility. "They displayed 'leaping-like' and 'walking-like' motions while continuously growing," Ren says.

While some bacteria can propel themselves using appendages like flagella, the microbial species in the current study are both non-motile. And differing from any known microbial motility, the assemblages used the fungal hyphae to anchor on the surface and then propel the whole superorganism forward, transporting the attached bacteria across the surface. Koo says, "like bacteria hitchhiking on the fungi."

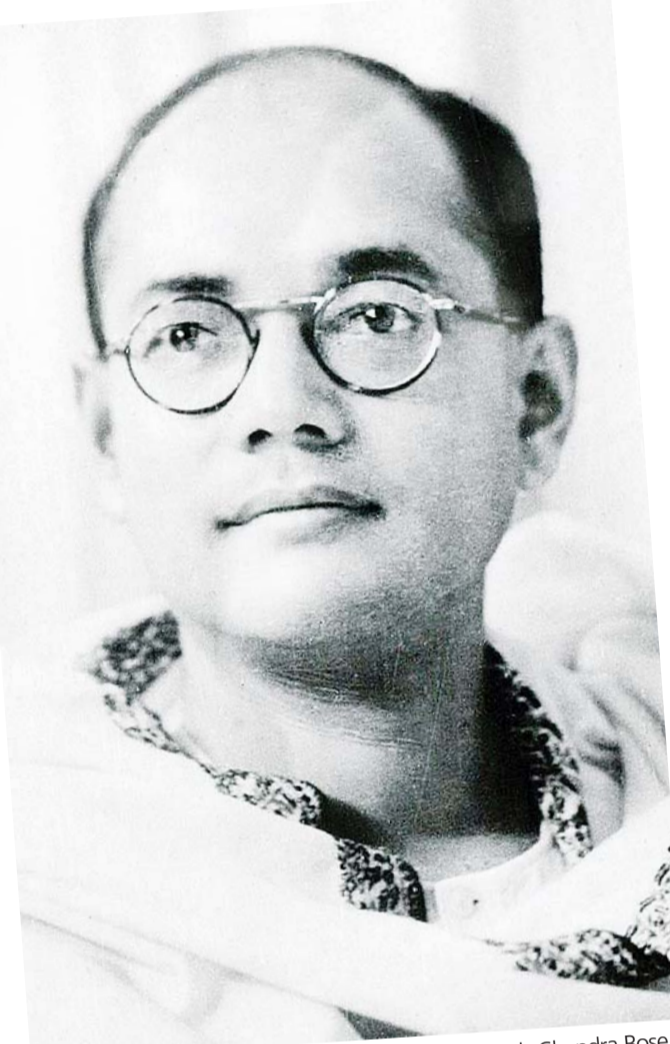
The microbial groupings moved fast and far, the researchers found. On the tooth-like surface, the team measured velocities of more than 40 microns per hour, similar to the speed of fibroblasts, a type of cell in the human body involved in wound healing.

Within the first hours of growth, the scientists observed the assemblages "leaping" more than 100 microns across the surface. "That is more than 200 times their own body length," says Ren "making them even better than most vertebrates, relative to body size.

Although the exact mechanisms are unknown, the assemblages' ability to "move as they grow," the researchers say, has one clear consequence: It enables them to quickly colonize and spread to new surfaces. When the research team allowed the assemblages to attach to and grow on real human teeth in a laboratory model, they found more extensive tooth decay as a result of a rapidly spreading biofilm.

# Hum Sub Ek Hain

...Mostly by choice, but if required by 'force' too!



Subhash Chandra Bose.



Indira Gandhi.

Sitaram Kesri

## THE BIG CONTESTS

### Subhash Chandra Bose and Pattabhi Sitaramayya

When Bose sought his second presidential term at the 1939 Tripura AICC session, the widening gap between Bose and Mahatma Gandhi, ideological and organizational outlook was evident. A group of senior leaders urged Bose not to contest but when Bose stuck in his heels, Maulana Azad withdrew and Sitaramayya was brought in.

**Nehru against Kripalani**  
Interestingly, Kripalani, whom Nehru had backed against Tandon, had a bitter fallout. He was the

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Congress chief with the then PM Nehru. The issue was the question of party-government relations. When Kripalani insisted on Congress' organisational supremacy on the party led government, PM Nehru compliantly refused and would not even talk on the matter, citing independence of the executive and its accountability to Parliament. When Kripalani quit in protest, Patabhi Sitaramayya

standing firm with Tandon and Nehru with Kripalani, the contest led to Tandon's victory. But Nehru refused to back off and even threatened to quit CWC. Patel's untimely death within months changed equations, and this forced Tandon to quit, and PM Nehru become Congress president too.

### Indira Gandhi Against Everybody Else

After Congress defeat in 1977, restlessness within the party was staring in the face, many leaders were raging against Gandhi. Pranab Mukherjee recorded how, at the AICC presidential polls in New Delhi in 1977, Indira Gandhi proposed Brahmananda Reddy as party chief and many of her rivals agreed. Although as a labourer

Ray, Karan Singh and Neki Ram. Subsequent developments resulted in Gandhi and her supporters launching 'Congress (O)', which after 1980 victory was recognized as the original Indian National Congress.

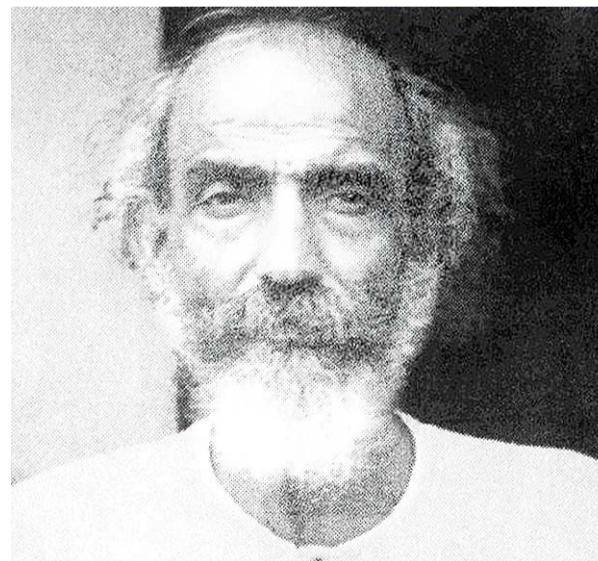
### Sitaram Kesri VS Sharad Pawar VS Rajesh Pilot

When CWC-appointed Congress president Sitaram Kesri sought election to the post in 1997, not many favoured and didn't believe in their 'chacha'. Yet, circumstances forced many leaders to root for Kesri when Maratha strongman Pawar and voluble Pilot put out their own candidature. If the spectre of skillful marathoner Pawar making a dash for leadership in 1991 prompted many and '10 Jampath' to back PV Narasimha Rao against him, the same group-

ing manufactured similar unity for Kesri. With nominated delegates following the command, Kesri netted over 6000 votes against Pawar's 889 and Pilot's 354. Pawar salvaged his standing when he contested against the 'official panel' and won a CWC berth in the ensuing Kolkata AICC session. Kesri was unceremoniously sacked within months of his crowning glory."

### Sonia Gandhi Against Jitendra Prasada

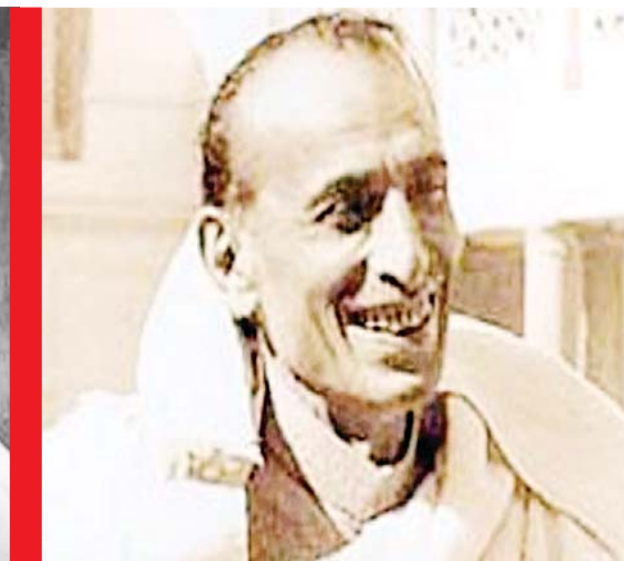
The 2000 presidential flight was a caricature of a contest. Prasada, experiencing a meltdown in Gandhi-led leadership, was forced into the fray due to lack of honourable options. Gandhi bagged over 7400 votes against Prasada's 67, further cementing the Gandhi family's final grip on the party.



Purushottamdas Tandon.



Pattabhi Sitaramayya.

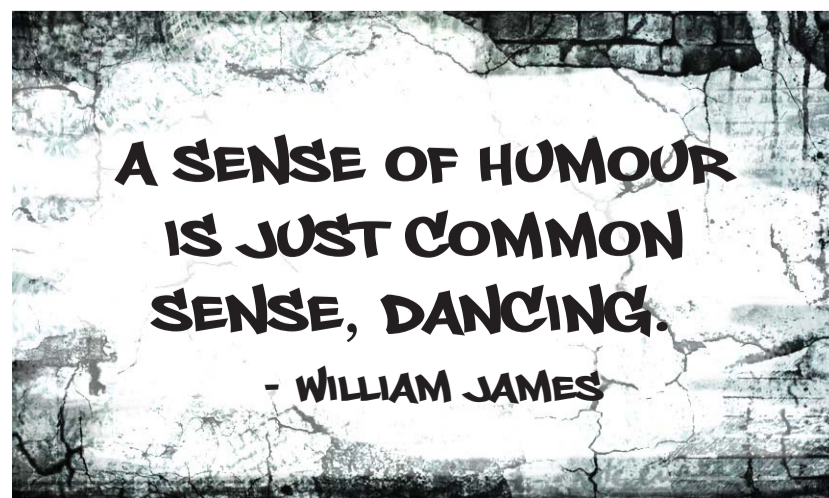


Acharya Kriplani.



Jitender Prasad.

## THE WALL



## BABY BLUES



By Rick Kirkman & Jerry Scott

## ZITS



By Jerry Scott & Jim Borgman

## Global Dignity Day



Global Dignity Day is an initiative to educate and inspire young people and help them to understand their self-worth and goals. On Global Dignity Day, speakers go into schools and tell pupils about their own lives and experiences with dignity and all that entails: self-respect, ambition, hard work, a feeling of accomplishment. Speakers can be of any nationality and any profession, from plumbers to CEO's to soldiers to factory workers. It's less about the profession and more about the attitude of the speaker towards his or her own life.

## #LIFESTYLE

Try these easy and creative Diwali light decoration ideas for home and so that every corner shines brilliantly.

**D**iwali is here, and the air is filled with the festive spirit! A massive show of lights, colours, and decorations accompanies Diwali. Given that this festival stands for the triumph of good over evil, Diwali decorations emphasise optimism with lots of lights and vibrant decorations.

People clean their homes, decorate them with lights, flowers, and Rangolis, and pray for prosperity and peace. Decorate your home for Diwali with cheerful accents and traditional decor mixed with modern touch.

The markets are flooded with different kinds of Diwali decorations, and you will certainly be spoiled for choice when it comes to doing up your own space. But simply buying Diwali decoration lights will not be enough for home decor this festival. What you need are impressive Diwali lighting ideas to make you stand out and keep you safe. That's why we've put together the best ideas.



### The Disco Lights

These lights are available as table lamps, ceiling bulbs and hanging lights as well. So, fixing these lights this Diwali is made rather convenient by the market. They are not as expensive and are readily available as well.



### Glass Jar Lanterns

This is one of the creative home decorating ideas. An empty glass jar can be used as a lantern. You can draw your own designs on them to make them more inventive. Either a diya or modest artificial lights can be placed inside. You can use these lovely glass jar lanterns to spruce up your home's shelves or balcony.



### The Strip LED Lights

LED strip lights are safe, and their appeal mostly relies on you and your creativity. But it helps to use them on the borders and to try and hide them away behind the edges of your furniture. Since these are also available in many colours and are bright, they are better than string lights that you may have planned on using.



### The Traditional Lanterns

You can pick up beautiful lanterns in all shapes, sizes and colours during the festive season. Pick out a nice lamp in metal or paper that will emit a kaleidoscopic effect on your walls. Your home will then be Diwali-ready!

## A Sparkly Festive Home

### Rope Lights

Battery-operated lights typically flood the market before the festive season. These lights come in all kinds of shapes, sizes and colours. One of the trending battery-operated lights is rope lights. They can provide a rustic or ethnic feel to your home, even going as far to give it a desi vibe.



### Colourful Candles

This Diwali, there are three different methods to use candles to create enchantment. For a stunning visual treat, use engraved candles, utilise colourful candles or use chic candle burners that have been stylishly carved.

### The Floating Diyas and Candles

To nail that contemporary look, you could try floating your Diwali decoration lights like diyas and candles in a large bowl of water. Surround them with some rose petals and marigold flowers and fill the air with mild fragrance. You will love how fresh your home smells and feels with Diwali lighting ideas like this one!



### Fairy Lights

Fairy lights are frequently used to embellish a house's facade. Bring them inside for an amazingly original Diwali decoration now. Your saviour is fairy lights, which can be placed in glass vases for a stunning illuminating effect or in puja rooms.