Cystinosis is a rare, genetic metabolic disease that causes the amino acid cystine to accumulate in various organs of the body. Without specific treatment, children with Cystinosis develop end-stage kidney failure at approximately age nine. The availability of cysteamine medical therapy has dramatically improved the natural history of cystinosis, so that well-treated cystinosis patients can live into adulthood.

In an imagined world where our bodies’ struggles unfold in microscopic cities with their own heroes and villains, one group of heroes fights for those few bodies that have been diagnosed with the rare disease, Cystinosis.

These heroes are known as...

THE

SUPER

CYSTEAMINE

TEAM

Created by Kevin Patrick McCalla

This book made possible thanks to a grant from the superheroes at:

Cystinosis
Research Network

Dedicated to a Cure. Committed to our Community.

Making lives better starts here.
The Cystinosis Research Network's vision is the acceleration of the discovery of a cure, development of improved treatments and enhancement of quality of life for those with Cystinosis.

raptor

Illuminating pathways. Empowering Science.
Raptor Pharmaceuticals is a commercial-stage, global biopharmaceutical company committed to developing and commercializing life-altering therapeutics for orphan diseases. Our focus is to help patients with rare, debilitating, and potentially fatal diseases by leveraging our deep understanding of cellular metabolic pathways to develop medicines that address serious unmet medical needs.

O sigma-tau
PHARMACEUTICALS, INC.
Rare dedication

Rare dedication
Sigma-Tau Pharmaceuticals, Inc. is a rare corporation dedicated to creating novel medicines for the unmet needs of patients with rare diseases. Truly unique in its field, Sigma-Tau places its considerable scientific resources behind the discovery of compounds that benefit the few. Simply because it's the right thing to do.

This comic book was funded by a grant from Raptor Pharmaceuticals and Sigma-Tau Pharmaceuticals, however, all opinions and statements expressed are of the author and Raptor and Sigma Tau were not involved in the creation or content of this comic book. Drawings, words, and concept ©Kevin Patrick McCalla. Logos ©their respective owners. Fonts provided by Blambot.com. All Rights Reserved.
On an ordinary night, in an ordinary room, an extraordinary child named James sleeps safely in his bed.

All seems quiet and peaceful...

However...

Beneath the surface...

Through the borders of the kidney...

Deep inside a cell, at the cellular level...

The bustling metropolis of Kidney Cell City is always awake, active, and could be in danger at any moment - day or night!

ART AND STORY BY
KEVIN PATRICK MCCALLA
In the city’s busy industrial district, important services like the Lysosome Recycling Plant run round the clock to keep Kidney Cell City safe and functioning.

But not even extraordinary, sub-cellular cities like this one are immune to crime and villainy! ...and their dangerously super-powered allies--

Kidney Cell City is home to the powerful Fanconi criminal organisation.

The Cystine spread and grow their crystals in the Lysosome, taking over the recycling plant and crippling Kidney Cell City in the process!

The Fanconi and The Cystine hold court over Kidney Cell City’s criminal underworld, as villains from across the city swear allegiance to the mysterious, cloaked leader of the Cystine...

...forming a deadly alliance that threatens all of Kidney Cell City!

As the combined forces of evil in Kidney Cell City wreak havoc outside, the sinister leader of this devious group plots destruction within the now crystallized walls of the Lysosome Recycling Plant...

Now...let all of Kidney Cell City tremble! With your great numbers and my matchless powers, none dare oppose us!

Soon the power of The Cystine will rule over this entire body! Hahaha HAHAAHAAA!!!
His alarm clock’s shrill buzz begins his morning routine. He stumbles groggily from bed and makes his way to the bathroom...

It means it’s time to wake up and take medications!

...where the greatest ally in the ongoing war raging inside his body is kept:

Of course, Cysteamine is not his only ally in this fight...

...and Cysteamine is certainly not without its problems...

The smell is not very pleasant...

The pills are bitter and difficult to swallow, and he knows in a few hours he may feel sick with a stomachache...

However he knows that these little pills, no matter how unpleasant, contain incredible hidden power!
The source of that power is locked away, hidden inside individual pills.

This power is invisible to the naked eye.

Carefully disguised within the contents of the capsules themselves.

Once again we enter the world of the sub-microscopic, to find a fantastic ship on a voyage within!

Is everyone ready?

I think so.

Let's go!

The tiny ship journeys far, moving through stomach oceans into the estuaries of bloodstream rivers.

I hope the people of Kidney Cell City are safe!

I'm sure they made it to the shelters by now.

The Cystine will pay for this!

I'll smash 'em all!

Carried by a school of friendly red blood cells, the ship and its crew grow smaller and smaller. Traveling through the body they are guided by a special system inside Cysteamine that seeks out cells in need.

Finally they reach their destination - Kidney Cell City! Unfortunately they arrive to find the city in chaos! The Cysteamine Team's enemies have been busy while our heroes traversed the body's bloodstream. They quickly prepare themselves for battle!

Let's hurry, Team! The City needs us!
The villainous alliance has all but taken over the city, converting the Lysosome Recycling Plant into their evil base of operations...

But not for long!

The Fanconi, Cystine minions, and other loyal minions of malice are defeated by the combined might of Team Cysteamine...until only their leader remains...

It's over, Cystine! Your minions are beaten and your evil alliance is disbanded!

You will never control this body! Give up peacefully, there doesn't have to be a fight.

...Never.
Then prepare yourself, villain!

YAAAHH!

Hmph.

Very well, Fool.

Be careful, Captain!

He might be stronger than he looks!

It seems our intrepid heroes have underestimated their foe!

This world is mine!

And now...

They struggle while facing his power!

Why fight it, Captain?

You can't beat me, I grow stronger by the minute.

My victory is assured!

You're not as smart as you'd like to believe you are, Cystine.

We will never stop fighting you, and this body will never be yours!

Besides... You forgot something important about us.

No matter how often we fight, or how many times we may fall...
"...We never fight alone!"

"He makes sure we have ellies sent to fight you and your kind."

"When we work with our friend as a team, you will never beat us!"

"You fools... think it's over... Heh Heh Ha Ha!"

"It's a detonator! Fall back!"

"What's that in his hand?"

"No challenge is too difficult when you face it with friends at your side!"
Everyone, TAKE COVER!

- BEEP -
- BEEP -
- BEEP -

00:03 00:02 00:01

BOOM!

Is everyone alright?
All present and accounted for, Captain.
Now let's start cleaning this up...

Huh...

Mrs. Peterson?

I don't think James is feeling well.
James, do you need to go see the nurse?

My stomach hurts a little...

Nurse Adams can help get you feeling good as new, okay?

Who would like to be James' hall buddy?

Are you okay? You go to the nurse a lot.

Yeah, I just have to take pills a lot and sometimes they make me feel sick.

My brother has to take pills to help him pay attention, what are yours for?

Haha, alright Sophie...

My mom says my body doesn't recycle right, so bad guys sneak inside and make me feel bad.

...so James takes medication to help his body fight to stay healthy.

Coooo!

I like yours, too!

Who's your favorite Superhero?

Anyway, I like your shirt!

James' disease is called Cystinosis, but it's not a disease like the cold that you can catch. You're born with it, like James was.

Sometimes it makes him feel sick so he has to go see the Nurse.

But it's just that he doesn't always feel very nice, and sometimes the pills can have a funny smell, and he needs more drinks and to use the restroom more often than those of us without Cystinosis.

Are there any questions?

Otherwise he's just like us, and we can help James feel better, like Sophie did, by being his friend. Just like we would want if we had Cystinosis.
I said, are there any questions?

No?

Then let's get to work, people! We're on the next train to the bladder, so let's do some good while we're still in town!

And make sure all the Cystine are secured, we're taking them with us!

The people of Kidney Cell City say goodbye to the Cysteamine Team grateful to be rid of the Cystine menace once again.

Even if it is only a temporary peace....

Captain, I don't understand? Why celebrate knowing we'll have to fight the Cystine again?

Because every day is a new victory. We have great friends and allies that will always be there for us. Besides....

"...Some things are worth fighting for!"
EPILOGUE:  
PROTECT THE EYES!
CYSTEAMINE!
Later that day...

Holding his eye wide open he gently squeezes a single drop over his eye...

Where a special Expeditionary Force of the Cysteamine team is ready for action, suspended in the eyedrop's solution!

James must also send The Cysteamine Team to his eyes - as often as possible!

Keeping his eye open and his hand steady, James releases the drop into his eye...

Where it will enter the eye and deliver our subatomic superheroes into the stark, wild lands of The Cornea!

So once again we glimpse a hidden microscopic landscape of the body's cells, where a vulnerable Lysosome Dam and Treatment Plant has been Frozen to a halt by the strange powers of the Cystine's deadly crystals!
The Cysteamine Team arrives and leaps into action!

But it looks like the Cystine are ready for a fight!

Keep it up! We've got 'em on the run!

Come peacefully! We don't have to do this the hard way!

NEVERRR! Thissa body is oursse!
Give it up, Cystine! It’s over, your comrades are beaten. Most have already surrendered...

Cystine: Lies!
Even if you stop using here, more will come! You’ll never--

Fine! We do it the hard way!

The Team’s captain moves to apprehend the villain...

...but a deflected blast ricochets, hitting the Cystine and knocking them backwards!

NO!

I think I’m ready to surrender...

Gotcha!

Mmph! Yeah, I’ll bet...
Do you want to discuss the terms, or...

No! Pull me up, I go with you!
Will you please quit squirming?

We just have to secure you for transport, then you'll be free to go.

Whee... Is that the last of them?

Looks like it.

All hostile Cystine are secured, tagged, and ready for transport, Captain!

Alright, calm down, rookie...

Sigh... Good, that means we've got a few moments to rest.

How are we ever going to beat them all, Captain?

And we're gonna need it. There's a lot of Cystine up there that needs our attention...

Persistence and Teamwork, rookie! We fight for a truly worthy cause!

The Cystine may not realize it, but we have allies they could only dream of...

Allies that can always rely on us to help...

...and we can always rely on them!

THE END

UNTIL THE NEXT DOSE!
ARTIST’S STATEMENT

I’VE ALWAYS BEEN INTERESTED IN ART, ESPECIALLY AS A MEANS TO TELL A COMPELLING STORY. PAINTINGS ON HOSPITAL WALLS AND VISITS TO GALLERIES AND MUSEUMS AROUND WASHINGTON D.C. WERE HIGHLIGHTS OF MY YEARLY TRIPS TO THE NATIONAL INSTITUTES OF HEALTH. I WAS DIAGNOSED WITH CYSTINOSIS AT 13 MONTHS, AND WAS EXTREMELY FORTUNATE TO ALMOST IMMEDIATELY BEGIN CYSTEAMINE TREATMENT.

LIKE MOST OF MY FRIENDS IN ELEMENTARY SCHOOL, MY LOVE FOR STORYTELLING AND ART EVENTUALLY RESULTED IN A FASCINATION WITH COMIC BOOKS THAT’S LASTED THROUGH TO ADULTHOOD. COMICS ARE A WHOLLY UNIQUE MEDIUM IN HOW THEY ENGAGE THE AUDIENCE, COMBINING ART AND WRITING IN A WAY THAT IS BOTH INFINITELY COMPLEX AND INSTANTLY ACCESSIBLE TO ALL AUDIENCES.

WITH THESE SHORT COMICS I HOPE TO UTILIZE THE UNIQUE STRENGTHS OF COMICS TO ENGAGE THE CYSTINOSIS COMMUNITY – PATIENTS OF ALL AGES, DOCTORS, CAREGIVERS, SOCIAL WORKERS, AND ANYONE WHO IS INTERESTED. I CAN ONLY HOPE THAT MY OWN EXPERIENCES LIVING WITH CYSTINOSIS HELP ME PRODUCE INTERESTING, MAYBE EVEN COMPELLING STORIES THAT OTHERS FIND HELPFUL, RELATABLE, ANDULTIMATELY ENJOYABLE.

Kevin McCalla
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