blistering skin diseases is due to begin in January. At her clinic, Raap has al-
ready changed several procedures and
structures, had a bathroom converted
into a patient reception area and swit-
ched to electronic patient records and
chiefly paperless offices.

Hans Gerd Nothwang, Internim Dean
of the School of Medicine and Health
Sciences, describes Raap as a “power
woman”. “One can hardly imagine how
much energy it takes for someone with
two children to build a successful aca-
emic career in medicine and on top of
that run marathons on the side,” he com-
ments. But Raap’s main mo-
tivation, he concludes, has to be her
fascination with the skin.

Dynamics and dramatic
events in the skin

Ulrike Raap discovered her pal-
able enthusiasm for our largest sen-
ory organ – and the close contact with
patients it entails – in the first year of
her medical studies, which she began
in Lübeck and completed in her home
city of Hannover. To finance her studies
she started working as a hospital assis-
tant and was soon on duty at the De-
partment of Dermatology in Lübeck on
a regular basis. “Even as an assistant I
was allowed to dress complex wounds,
and I really enjoyed it and had fun,” she
recalls. The team she worked with
was always very friendly and relaxed,
and this made a lasting impression
on her. When her clinical clerkship
ended her colleagues at the Hanover
Medical School’s Dermatology Depart-
ment convinced her to do her doctorate
there. This was followed by specialist
training in dermatology.

Ever since, Raap’s research has dug
deeper and deeper, exploring the skin
and that this correlates with the pro-
gression of the disease.

Bling blisters – blisters caused by blisters

When someone comes to you with
itching and was first discovered in
1999. Eosinophils are mobile cells that develop
in the bone marrow and mainly play a
role in fighting parasites. “The eosino-
phils migrate to sites of inflammation,
which is exactly where they are nee-
ded,” Raap explains. “So if a person has a
parasite in their intestine, for example,
those cells receive a signal, march in,
and start firing oxygen radicals and
cytokines (a group of proteins) at the
parasites. In the end the parasite is
eliminated from the body full of holes.”

But these parasite-fighters also play a role in quite a few skin diseases. “When someone comes to you with
neurodermatitis and you see that eosin-
ophil granulocytes – along with their
weapons arsenal – have accumulated
in the skin, you know why their skin is
so inflamed.” The dermatologist and
her team discovered that, in patients
with neurodermatitis, eosinophils can produce and release a nerve growth
factor called BDNF. According to their
research, the resulting “hyperactive
nerve cells are one reason why neuro-
dermatitis patients frequently suffer
from itching skin.”

Itching is another topic in Ulrike
Raap’s research portfolio. She disco-
overed that levels of a protein called interleukin-31 (IL-31), that is known to
cause itching and was first discovered in
2004 by American scientists, correlate
with the severity of the disease in neu-
rodermatitis patients. “Putting this to
the test was actually a very simple idea I
came up with when I was changing my
son’s nappies,” she recalls. “At the time
I really enjoyed it and had fun,”

Layer by Layer,
Cell by Cell

The skin, our largest sensory organ, is the subject of dermatologist Ulrike Raap’s research
and medical care. She describes it as an “architectural masterpiece” and hopes that by gai-
nings to a better understanding of its components she can pave the way for the development
of novel treatment approaches

Shimmering soap bubbles float
across the stage in the Experimental
Auditorium on the University’s Wech-
loy Campus, blown by the youngest
members of the audience attending
dermatologist Prof. Dr. Ulrike Raap’s
lecture “When the skin bubbles up” –
her two sons. The 45-year-old has just
held her inaugural lecture but she has
never have guessed that we would end
up publishing this project in one of the biggest immunological journals.”

This research led to another out-
standing publication – which also won
a lucrative prize – in which Raap, to-
gether with a colleague from Lübeck,
studied interleukin-31 concentrations
in mastocytosis patients. Mastocytosis
leads to the accumulation of mast cells
(= mastocytes) normally present in
human skin, which can release his-
tamine that triggers itching. This is
a serious disorder, Raap explains: “When
 mast cells accumulate in the intestines
patients may suffer from diarrhoea;
when they accumulate in the bone
marrow this can lead to osteoporosis.”

She and her colleague discovered that
increased levels of interleukin-31 are
also released in mastocytosis patients
and that this correlates with the pro-
geration of the disease.

When the sticking
dow power of chewing
gum isn’t enough

In the meantime, a direct link has
evolved between the itch-producing protein IL-31 and eosinophil granulocytes – the blood cells
that look like sunglasses under the
microscope. This link is evident in
bouillous pemphigoid, an autoimmune
blistering skin disorder. In this disease,
the dermatologist explains, autoim-
unne antibodies “cause the skin cells
that usually stick together like strips
of chewing gum to separate, resulting
in the formation of a blister.” In such
cases elevated levels of eosinophils are
present not only in the skin and in the
blood but also in extremely highly con-
centrations in the blister fluid – “like
little nuclear power plants”. The eos-
nophils can release IL-31 and in turn be
activated by it, resulting in a perpetual

With her research, dermatologist Ulrike Raap aims to gain a better understand-
ung the cellular processes in skin diseases and combat the causes.
motion machine. “It’s all interconnected,” Raap stresses.

Gaining a better understanding of the cellular processes in skin diseases in order to combat them more effectively is the main goal of Raap’s research. Among other things, she leads a sub-project in a clinical research group funded by the German Research Foundation (DFG) on bullous pemphigoid. In this project, in addition to eosinophils, she is also studying basophil granulocytes, which play a role in allergic – and acute and potentially life-threatening – inflammation. She is also involved in a project led by a colleague in Münster on the topic of itching. And in January the project funded by the Oldenburg faculty of medicine begins in which Raap and her Groningen colleague Jonkman aim to establish a special skin model for blistering autoimmune disorders.

Detective work in cases of unexpected allergic reactions

Raap not only combines her research, for example the weekly meetings with Bernhard Gibbs, her Head of Research at the Wechloy Campus, with her post as Director of the dermatology clinic and its private and outpatient services, she also teaches at the “European Medical School”. She enjoys “showing young people all the great things we are doing in dermatology”, she says. Treating sexually transmitted diseases at the clinic, doing detective work in unexpected cases of contact dermatitis, dealing with serious autoimmune disorders or operating on sebaceous cysts or skin cancers: the broad spectrum of activities her field offers is “a dream come true” for Raap.

In her research and teaching as well as at the clinic, the patients’ well-being is always her top priority. “We work on the patient and with the patient, and our goal here is to develop new treatment options for the patients.” Raap stresses. To this end her team deals with the “full spectrum” of immunological research: “No cell is safe when we’re around,” she jokes. All with the goal of ensuring that – contrary to the title of her inaugural lecture – the skin doesn’t “bubble up”.

Eosinophile granulocytes: because of their double nuclei they “look like they’re wearing sunglasses”. Since Ulrike Raap earned her doctorate in 1999 her research has repeatedly focussed on these mobile cells that migrate to sites of inflammation and have been linked among other things to itching.