

# Medizin, Gewürz oder Mageninhalt?

## Konsum von Nicht-Nahrungspflanzen beim Neanderthaler

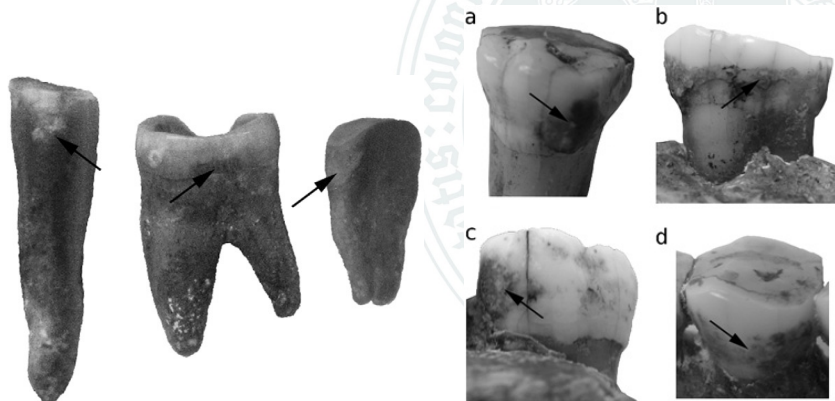
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Seminar: Low, Slow, Vegan oder Paläo?  
Entwicklung der menschlichen Ernährung  
Sommersemester 2016  
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# Zahnstein an neuen Quellen



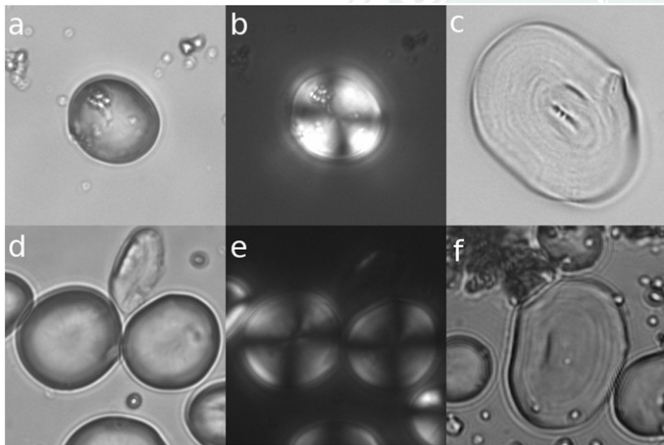
Zahnstein an Zähnen von Shanidar III (links), Spy I (rechts ab) und Spy II (rechts cd); ungleiche Maßstäbe [He11].

# Stärkekörner im Zahnstein



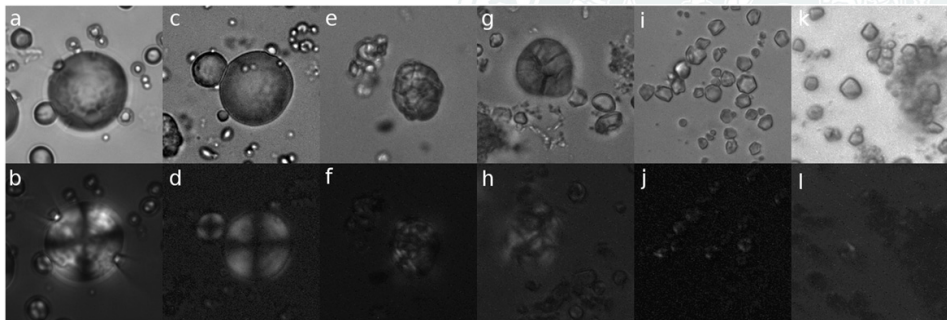
Mikroskopisch sichtbare Spuren im Zahnstein von Neanderthalern aus El-Sidrón.  
a) Stärkekörner in der Matrix; b) beschädigtes Stärkekorn in polarisiertem Licht;  
c) fadenförmige und kugelige (coccus) Bakterien [Ha12].

# Gerstenstärke in Shanidar



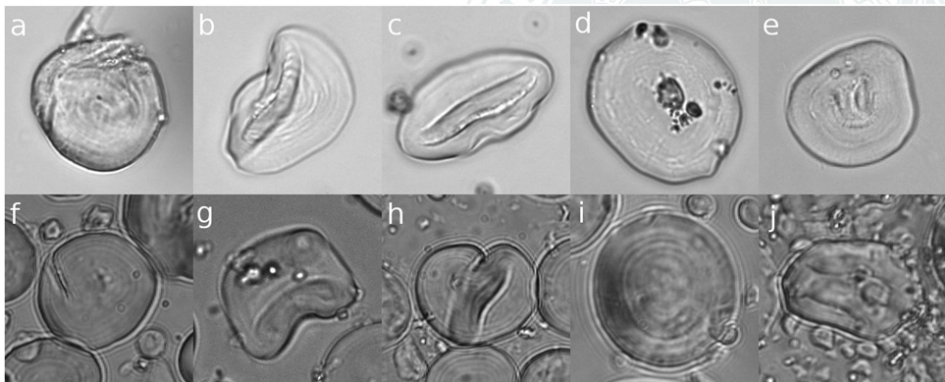
Rezente Gerstenstärkekörner im Vergleich zu denen aus Shanidar. ab) Shanidar im Hellfeld und kreuzpolarisiert; de) dasselbe rezent; c) gekochtes Korn aus Shanidar; f) rezentes Korn nach 5 Minuten Kochen [He11].

# Kauen beschädigt Stärkekörner nicht



Vergleich zwischen rohen und zerkaute Stärkekörnern, oben Hellfeld, unten kreuzpolarisiert, links roh, rechts gekocht. a–d) Weizen; e–h) Hafer; i–l) Reis [He11].

# Alte und rezente gekochte Stärke im Vergleich



Gekochte Stärkekerne, oben Shanidar, unten rezent;  
a–d und f–i: Gerste; e und j: Weizen [He11].

# Rauch, Bitumen und Heilpflanzen

Sample no.	SEM analysis	MS Markers	Microfossils	Interpretation
Adult 2				
SD-1427m	NA	NA	9 starch	Ate starchy food
SD-1427b	NA	NA	>20 starch 1 phytolith	Ate starchy food
SD-1427c	Filamentous and coccoidal.	NA	8 starch	Ate starchy food
SDR-007c	NA	HC, FAME, C, PAH, Ho, Ph Pr	20 starch	Ate several different cooked starchy plants. Inhaled woody smoke. No evidence for protein. Evidence of contact with oil shale/bitumen.
Adult 3.				
SD-1217c	Filamentous and coccoidal.	HC (trace)	8 starch	Ate cooked starchy food
SD-1218a	NA	NA	7 starch	Ate starchy food
Adult 4				
SD-1604	NA	HC, C, PhOH, PA, PAH, Az, Co, Ac*	0 starch	Ate a range of cooked carbohydrates. Azulenes and coumarins consistent with yarrow and camomile. Inhaled wood smoke and/or ate smoked food. Protein markers. No evidence of lipids from animal meat. Traces of moulding material.
Adult 5				
SD-1327i	NA	NA	5 starch	Ate starchy food
SD-1327 h	NA	NA	8 starch	Ate starchy food
Juvenile 1				
SD-1716			4 starch	Ate starchy food

Key to abbreviations: *HC* hydrocarbon, *FAME* fatty acid methyl ester, *C=2*-cyclopenten-1-one derivatives, *PAH* polynuclear aromatic hydrocarbons, *Ho* hopanes, *Ph* phytane, *Pr* pristane, *PhOH* phenols, *PA* phenolic acids, *Az* azulenes, *Co* coumarins, *Ac\** acrylates \*modern contamination (for details on chemical compounds, see ESM\_4.pdf)



## Oder Mageninhalt von Pflanzenfressern?

“One of their greatest delicacies is the contents of a reindeer’s stomach. If a Greenlander kills a reindeer, and is unable to convey much of it home with him, he will, I believe, secure the stomach first of all; and the last thing an Eskimo lady enjoins upon her lover, when he sets off reindeer-hunting, is that he must reserve for her the stomach of his prey. It is no doubt because they stand in need of vegetable food that they prize this so highly, and also because it is in reality a very choice collection of the finest moss and grasses which that *gourmet*, the reindeer, picks out for himself. It has undergone a sort of stewing in the process of semi-digestion, while the gastric juice provides a somewhat sharp and aromatic sauce. Many will no doubt make a wry face at the thought of this dish, but they really need not do so. I have tasted it, and found it not uneatable, though somewhat sour, like fermented milk. As a dish for very special occasions, it is served up with pieces of blubber and crowberries” (Nansen, 1893).



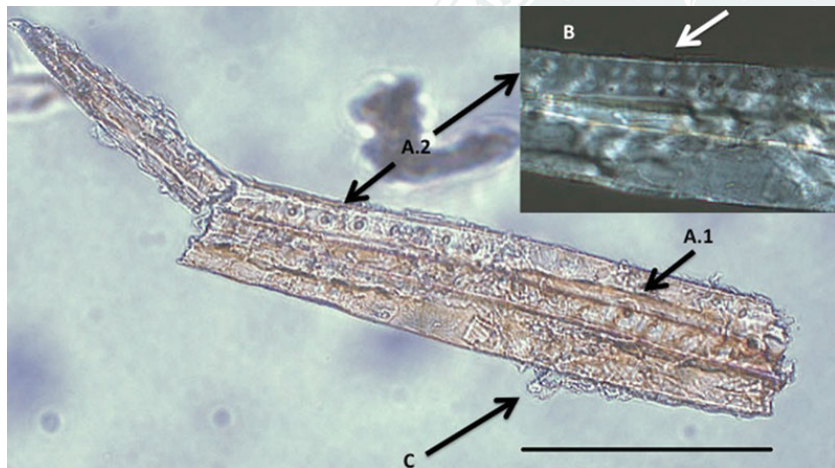


# Oder als Gewürz zur Geschmacksverssierung?

Ingestion order	Leaf species chewed with meat	Part of prey	Chimpanzee consumer
1, 8	<i>Diospyros abyssinica</i>	abdominal muscles	KK (adult male)
2, 7	<i>Chrysophyllum albidum</i>	stomach and intestine	AJ (adult male) LR (adult female)
3, 4	<i>Uvariopsis congensis</i>	carcass	LR (adult female) KK (adult male)
5	<i>Teclea nobilis</i>	carcass	LR (adult female)
6	<i>Antiaris toxicaria</i>	carcass	OG (juvenile male)
9, 10, 11	<i>Bosqueia phoberos</i>	carcass	OU (adult female) OG (juvenile male) OT (juvenile female)
12	<i>Urera</i> sp.	skin, head	QT (adult female)
13	<i>Trema orientalis</i>	abdominal organs	AJ (adult male)

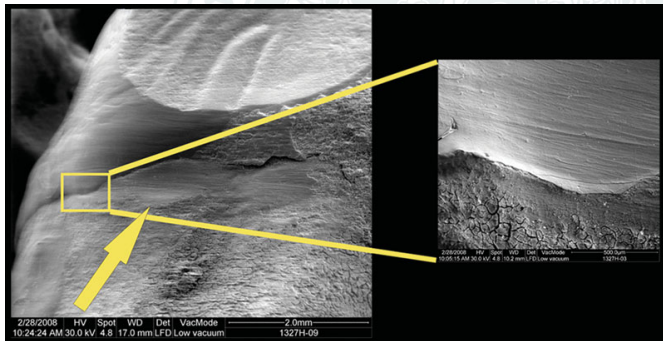
Blätter, die von Schimpansen in Kanyawara, Kibale Nationalpark, Uganda, zusammen mit dem Fleisch von gejagten roten Kolobusaffen gekaut werden [Kr15].

# Mund und Zähne als Werkzeug



Ein Splitter Nadelholz aus dem Zahnbelag eines Neanderthalers von El Sidrón.  
C) anhaftender Zahnstein. Maßstab 100  $\mu\text{m}$  [Ra16].

# Zahn als Werkzeug



Beginnende Furchenbildung an einem Zahn aus El Sidrón durch Verwendung als Werkzeug (Fasern) [Ra16].

# Zahnstein als Archiv für das Microbiom

## Pathogens and host immunity in the ancient human oral cavity

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## Ancient teeth reveal clues about microbiome evolution

**Jyoti Madhusoodanan**, *Science Writer*

**5764–5765** | PNAS | **May 24, 2016** | vol. 113 | no. 21



12 / 15



## Mögliche Quellen für Materialspuren im Zahnbelag:

- Konsum von Nahrungspflanzen (He11)
- Konsum des Mageninhaltes von Jagdwild (Bu14)
- Nicht-Nahrungspflanzen als Medizin (Ha12, Ha13)
- Nicht-Nahrungspflanzen als Gewürz (Kr15)
- eingatmeter Rauch oder Staub (Ha12)
- Gebrauch der Zähne als Werkzeug (Ha12, Ra16)
- Zahnhygiene (Ra16)

## Vielen Dank

Handout und Literatur liegen auf:  
[www.axel.berger-odenthal.de/work/Referat/](http://www.axel.berger-odenthal.de/work/Referat/)



# Literatur

- Bu14 **Laura T. Buck & Chris B. Stringer**,  
*Having the stomach for it: A contribution to Neanderthal diets?*  
*Quaternary Science Reviews* 96 (2014), 161–167.
- Ha12 **Karen Hardy et al.**,  
*Neanderthal medics? Evidence for food, cooking, and medicinal plants entrapped in dental calculus.*  
*Naturwissenschaften* 27 (2012), 617–626.
- Ha13 **Karen Hardy, Stephen Buckley & Michael Huffman**,  
*Neanderthal self-medication in context.*  
*Antiquity* 87 (2013), 873–878.
- He11 **Amanda G. Henry, Alison S. Brooks & Dolores R. Piperno**,  
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*PNAS* 108 (2011), 486–491.
- Kr15 **Sabrina Krief, Camille Daujeard, Marie-Hélène Moncel, Noemie Lamon & Vernon Reynolds**,  
*Flavouring food: the contribution of chimpanzee behaviour to the understanding of Neanderthal calculus composition and plant use in Neanderthal diets.*  
*Antiquity* 89 (2015), 464–471.
- Ma16 **Jyoti Madhusoodanan**,  
*Ancient teeth reveal clues about microbiome evolution.*  
*PNAS* 113 (2016), 5764–5765.
- Ra16 **Anita Radini, Stephen Buckley, Antonio Rosas, Almudena Estalrich, Marco de la Rasilla & Karen Hardy**,  
*Neanderthals, trees and dental calculus, New evidence from El Sidrón.*  
*Antiquity* 90 (2016), 290–301.
- Wa16 **Christina Warinner et al.**,  
*Pathogens and host immunity in the ancient human oral cavity.*  
*NatGen* 46 (2016), 336–344.